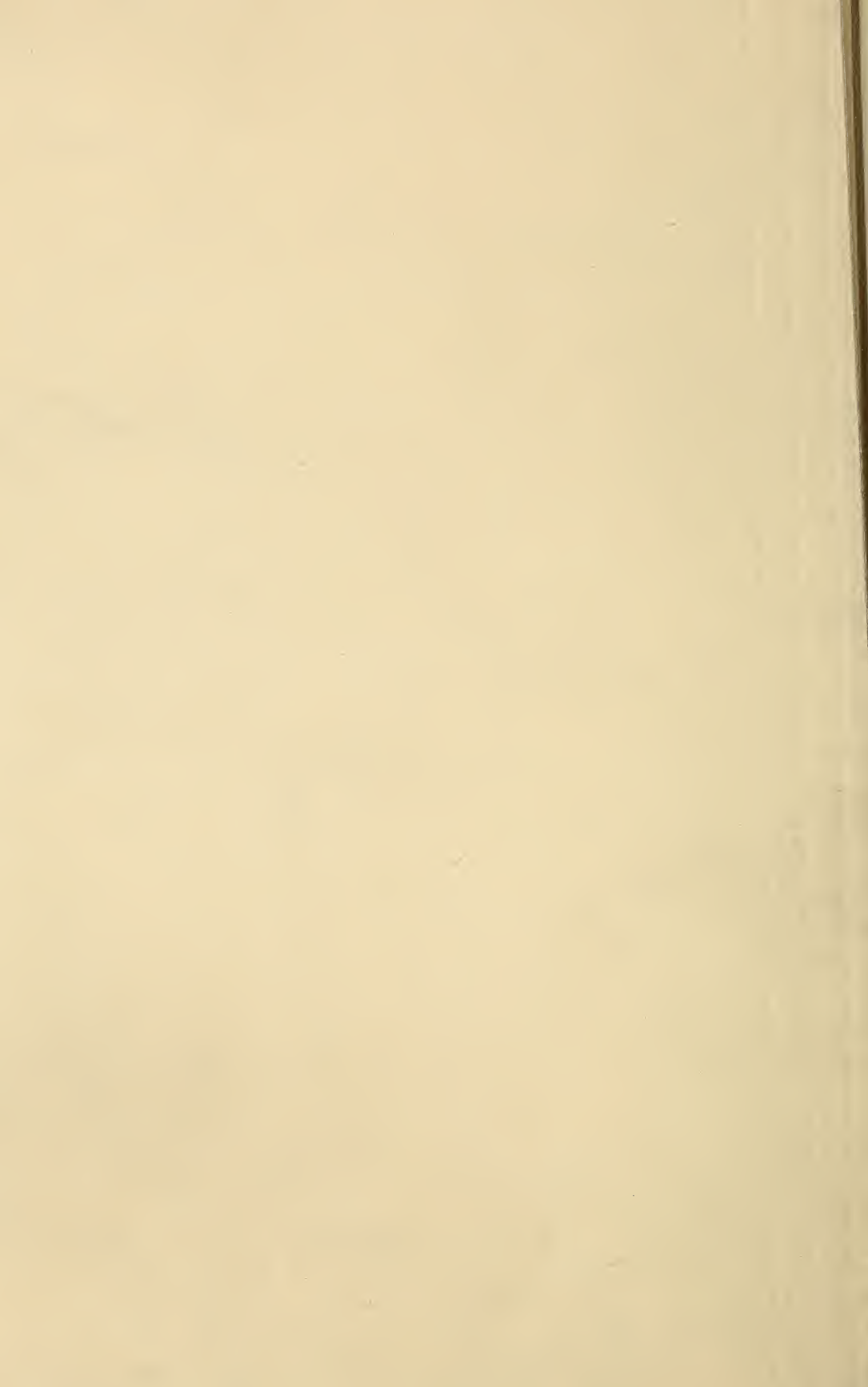


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A JOURNAL
 DEVOTED
 TO BEES
 AND HONEY
 AND HOME
 INTERESTS

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No. 9.

FROM DR. C. C. MILLER.

A $4\frac{1}{4} \times 4\frac{1}{4}$ SECTION, no matter what its thickness, will be $\frac{1}{4}$ inch thicker without separators than with, and will weigh nearly three ounces more.

VINEGAR can not be made from honey, says C. P. Dadant, in *American Bee Journal*, if you make it stronger than 3 pounds of honey to a gallon of water.

SKYLARK reports feeding boiled juice of Muscat grapes for wintering, and this spring he's boiling raisins and then pressing the juice for spring feeding.—*American Bee Journal*.

A HUGE BEE-TREE, in 1884, in Australia, according to a report in *Progres Apicole*, yielded 7700 pounds of honey. Wonder if a decimal point couldn't be worked in somewhere to advantage in that 7700!

IN SOME RESPECTS thick separators are better than thin; but a strong argument in favor of thin separators is that they are so cheap they can be thrown away when used once, saving the trouble of cleaning.

THE *Pacific Bee Journal* blames light-weight sections for demoralizing the Los Angeles market. The buyer buys light weights at 9 cts. by the piece, then uses that as a leverage to buy the next lot at 9 cts. a pound.

SOME FRENCH WRITERS say a queen will not go up to lay in a super if the direction of the combs crosses that of the combs in the lower story, unless there are drone-cells above. There seems no reason for that, but they claim it holds good.

DRAWN COMB with cells $\frac{1}{4}$ inch deep measures 8 feet to the pound, and thin foundation 10 feet. Is it worth while to make much fuss about 25 per cent more "gob" in a section, especially if that "gob" is mainly a matter of imagination?

THOSE DEFINITIONS on p. 286 are all good but

the last, which might better be called "leveled comb," for it's "drawn comb" just as much before it's leveled as after. [Yes, I like your term "leveled comb;" and as we have only just begun the use of the word, GLEANINGS will adopt it in preference to drawn comb.—ED.]

TELL US HOW you fasten drawn foundation in sections. I suppose a Daisy fastener might be arranged to work, but hardly a Parker. But no one who has tried a Daisy would use a Parker. [We have been using the Daisy so far. It would be impossible to use the Parker, of course.—ED.]

DOOLITTLE, p. 286, favors natural swarming, and thinks if artificial increase is practiced it is greatly better to wait "till very near, or just at the close of the harvest." He gives such good reasons for this latter that it raises the question whether it may not be better than natural swarming, which comes generally near the beginning of the harvest.

APIS DORSATA, it is generally taken for granted, has a longer tongue than the common bee. John A. Pease questions this, seeing dorsata is an entirely distinct species. "The bear is a much larger beast than the cat, but he has a shorter tail, and it may be so with this bee's tongue.—*Pacific Bee Journal*. [See editorials regarding *Apis dorsata*.—ED.]

JUST AS MUCH FUN watching the bees get to work this spring as it was 35 years ago. [It is a pleasure to know, doctor, that you have not lost your old-time enthusiasm. Young chaps like you and I, even if there is a difference of 31 years between our ages, can not afford to lose our love for the business. Some people never grow old, and you are one of them.—ED.]

C. DADANT thinks it not necessary, but a damage, to give bees water in transit. They need much when flying, but not when shut in.—*Revue Internationale*. [We used to give bees water in transit, but gave it up principally because the water leaked out, softened the prepared sugar feed, and daubed the bees up. Personally I should be inclined to think

water is an advantage, provided the difficulty mentioned could be successfully eliminated.—Ed.]

HON. EUGENE SECOR is a good man wherever he has been tried so far, and he's likely to keep up his reputation as General Manager of the U. S. Bee-keepers' Union. [Yes, indeed, he is a good man all round. He is popular, influential, and a thorough-going business man, and one whom it is a real pleasure to know. With all his other accomplishments he is the poet laureate among the bee-keepers of America.—Ed.]

THE PRICE of drawn foundation must come down a good bit before I can afford to fill sections with it, but I think I might afford it for bottom starters. [Of course, it is understood that our drawn foundation is now made on small dies, and at present prices could not be sold very cheaply. We hope, before the season is out, to have dies 5x8, at which time we shall be able to supply our friends with the product, at reduced prices. Next season, if the article proves to be the success that is now seems assured, we shall make dies and hydraulic machinery on a sufficiently large scale to supply the article in quantities, and at prices within the reach of bee-keepers.—Ed.]

DR. L. LATINNE says in *Progres Apicole* that drone comb within the cluster of bees in winter is detrimental. Each empty cell has a bee, making the cluster 50 per cent less compact where drone-cells are. He thinks spreading the combs for winter is at least useless, as with empty cells the bees are practically clustered solid. [Before the advent of Hoffman frames, in our apiary we invariably spread the frames in the fall for winter, thinking it to be an advantage; but since using the self-spacers we have been in the habit of leaving the frames just as they are in summer; and our success in wintering has been just exactly as good; indeed, we have had much better results in the last four or five years. While we would hardly attribute it to the closer spacing it is very evident that just as good results can be and are secured.—Ed.]

RIETSCHKE, the inventor of the Rietsche foundation press, of which 10,000 are now in use, a press turning out 150 sheets in an hour, now uses a lubricant made as follows: Put into a little bag 2 ounces soft soap; stir the bag in 5 quarts warm water till the soap is thoroughly dissolved; then add 5 qts. cold water. [Strangely enough, we sent for and obtained one of these presses, and we made it work after a fashion, but it was altogether too slow. It now stands on a shelf, unused. It is doubtful whether such a machine would find a sale in this country, even if advertised at the same price as in Germany, because, at present prices of foundation, no bee-keeper could afford to make his own, es-

pecially if he could turn out only 150 sheets an hour. Foundation-making in this country is now left almost entirely to the large makers; and very many of the large supply houses can not afford to make their own, because they can buy cheaper.—Ed.]

MY EXPERIENCE has led me to like thin surplus foundation better than extra thin. How does that compare with the general drift? What's the proportion of thin to extra thin manufactured? [The foreman of our foundation department tells me there is about a half more of thin called for than of extra thin, notwithstanding the fact that, since the advent of the new Weed process, we have made the *thin* about as light as the old extra thin, and the extra thin lighter still. The new process of sheeting makes the foundation so much tougher that we found we could make all our grades of foundation lighter; and I believe that our extra thin, light as it is, 12 to 13 feet, will be more acceptable to the bees than our old extra thin of 11 to 12 feet to the pound. Another season it may be possible to reduce the weight still more. Your experience that led you to prefer the thin was reported in GLEANINGS, and was at the time we were making foundation by the old process.—Ed.]

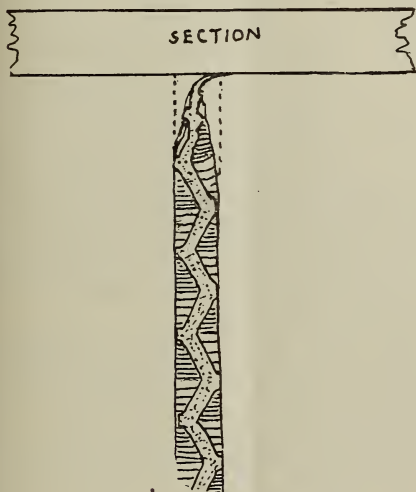
I DON'T KNOW every thing, Mr. Editor, but I *think* I know that you don't know what you're talking about on p. 286. I've used drawn combs by the thousand, and I don't care how deep the cells are so they're nice and clean, and don't come close enough to the separators to be bridged. [While you are perhaps able to use full-depth cells, the majority do not seem to make a success of it. While I may be wrong, I base the reasons for my opinion, as stated on p. 286, on two things: Honey stored in shallow cells, the cells being drawn out gradually as they are filled, acquires a certain delicious flavor that I do not believe will be found in honey stored in deep cells at the start. Theoretically, at least, honey will ripen in shallow cells more perfectly than in deep ones. A good many people always believe that comb honey is a little finer-flavored than extracted; and I believe the real foundation for this belief lies in the fact that honey in sections is generally produced from foundation (comb-building keeping pace with the storage), while the extracted is almost invariably stored in full-depth extracting-combs. My second reason for favoring the shallow-depth drawn (or level) comb is that the bees have a chance to work the cell walls over, where, if they were full-depth, they would let them alone. In any case, full-depth or not, one object of leveling is to take off the top of the cells the slight ring of wax that the bees always leave, because the cell walls themselves without this ring would not be strong enough to withstand the constant travel of the bees.—Ed.]



By R. C. Atkin.

FOUNDATION-FASTENER.

It seems to me there is yet much imperfect work in fastening foundation in sections. I have used the pressure method, pressure and heat combined, and heat alone. Here is a test to prove to any one who will try it that pressure or mashing it on is not good work: Press on a piece of foundation, then bring it into position in which it should hang, and look closely at the point of contact with the section. Here is an enlarged view of how it will appear.



The foundation is pressed into a wedge shape, the thin edge of the wedge adhering. If the wax would adhere before being cut partially off, there would be no difficulty; but as the pressure increases, the wax is pressed out thinner; and by the time the pressure is heavy enough to make the wax adhere, the foundation is about half cut off; and as the sheet is bent to bring it to proper position, a portion peels from the wood.

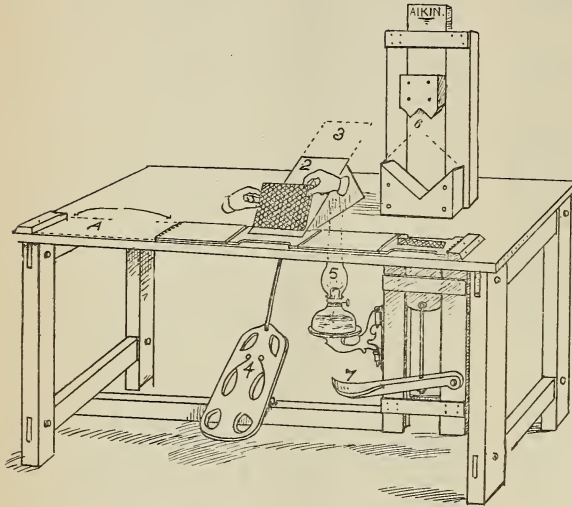
I have a rude machine that I have used for several seasons, and it does good work. It is original with me, is not patented, and is not on the market, so do not order one, for I am not manufacturing them. It is a hot-plate foundation-fastener and section-press, in one machine. I wish, however, to speak particularly of the fastening work, for that is the more important.

The plate stands at an angle of about 45 degrees, and the section is placed under the *lower* end. I put the foundation in before the section is folded. Here is the method. Before me at easy working height is a table (1). Above the table is arranged the plate (2), pointing toward me and downward, while under the table is the lamp (5) for heating, and a tread (4) that throws the plate forward (toward me) and downward, sliding at the angle at which it is set. The sections are previously dampened at the *grooves only*, by pouring a small stream of water through the grooves before opening the crate, or bunched. I pick up a section and put it on the table, and by the foot-lever throw the plate out till it rests on the section *just where the foundation is to go on*. While the plate was at rest, the wax left on from the previous fastening accumulates on the very end, and when it comes down on the next section the hot wax is at once, as it were, fried into the grain of the wood. The plate must be so hot that it will instantly melt the edge of the sheet of wax when applied, and the wax must be quickly applied and the plate withdrawn *before the section is heated*, and the foundation set in the line of the melted wax on the section. The plate must be hot, the section and foundation *both cold*, then the wax sets or hardens quickly. Just as soon as the foundation is in place, and almost as rapidly as one can handle the sheets, the wax will be cool enough to almost support the foundation in an upright position. I use a bottom starter and put it on first, then put on the full sheet and support it with my fingers while I pick up the section and bring the ends together with the foundation in a hanging position, place the section in the press, and fasten it, and at once set it in a super.

The illustration shows the starters on in such a way that, when the section is in the hive, the dovetailed corner is down. This is the way many use it, and has in its favor the fact that the dovetailing does not show so plainly when the section is set right side up. Some also prefer them so because, otherwise, when they take hold of the top to lift a section, the corner is apt to pull loose. The former idea in regard to appearance has some little weight, though not enough to be seriously considered; but the latter has no weight whatever, because when once a section is properly filled with honey any pull that would pull out the top is altogether unnecessary in any manipulation.

I prefer to put the bottom starter where the illustration shows the full sheet being put on, and the full sheet or top starter on the end where appears the bottom starter, so when I lift the section from the table to place in the folder I have the full sheet *hanging* instead of *standing*, and the dovetailing comes up under the head-block just above the numeral 6. The folder (6) is set just as close to the plate as it

can be, to have it as nearly as possible immediately in front of me. As the pressure necessary to close the section is much greater than that used in operating the plate, I put the folder to the right, that the right foot may operate the lever (7) in closing the section.



I think all will see at a glance the manner of handling the section while putting on the foundation. The little blocks at either end of the table are so placed that, when the section is shoved to one end, it is just right for the bottom starter; and, shoved to the other end, just right for the top starter.

The illustration I have prepared for this is not just as I have my machine, and not what it should be. The machinery I use in operating the plate and folder is not all shown. It would require two or more engravings to show it all. This, however, shows the manner of getting the foundation on and the section closed, which is what I wish to write of here. To illustrate in detail, so that one may copy exactly in building such a machine, is rather beyond my skill as a draughtsman, and no doubt more than the editor would care to have engraved.

As for the work of this machine, it is first class. When it is operated rightly the fastening is so perfect that the foundation will part somewhere else before it will let loose from the wood.

The only difficulty is in getting the section closed without injuring the fastening by springing the top by the heavy pressure needed to set the dovetailing, or by allowing the sheet of foundation to lop over when neither soft nor hard. It requires some pretty good judgment to handle it just right, and something that is very hard to tell.

The reason for putting foundation in before

folding is because of the difficulty of getting the fingers in to hold the foundation when the section is folded. I had intended to devise something to hold the foundation, and to cut off the required length, though up to this time I have never had the time to accomplish it.

These things might be developed faster if some inventive genius could receive the proper stimulus; but as it now is, the man who invents some good thing is *usually* more of a benefactor than benefited. I have been told—but can not say as to the truth of it—that some manufacturers of large means and extensive works keep one or more experts in their establishments, whose duty it is to study out better methods and improvements.

That bottom starter is a grand thing. I have just read in the *American Bee Journal* some of Editor York's experience in getting a lot of broken-down comb honey. The total shipment was 2300 pounds, and 550 of that broken down—almost one-fourth of it. I have had a little break down myself, but I know it is possible to have sections so firm that nothing short of smashing the case would break the honey loose from the section. I have had some such, and know whereof I speak, and know that bottom starters are a great help in getting such. There should *always* be a bottom starter, whether only starters be used or full sheets.

The producer of comb honey for the general markets can not afford to do any half-way work. There must be no foundation pulling down in the section, and there must be no breaking down of the finished product in the case. I know what it is to have fine plump finished sections, and I know what it is to have such poor finish that I hardly dared to hold the section sidewise for fear the honey would drop out of its own weight. I must say that our honey is put on the market in a crude way, and especially is this true of the extracted product.

Loveland, Col.

[I agree with you that the heated-plate plan gives a much better fastening, and I may add the work is more rapidly done. While some prefer two machines in one (folding the section and fastening the foundation) we prefer two machines—one for each operation. We find the two are more rapid, simpler, and cheaper than any combined machine we have ever operated; and we have tried a good many. We have never tried the Aikin machine, and, of course, are not prepared to speak of its merits. —ED.]

If you would like to have any of your friends see a specimen copy of Gleanings, make known the request on a postal, with the address or addresses, and we will, with pleasure, send them.

THE GRANULATION OF ALFALFA HONEY, ETC.

LACK OF BODY AND PROPER MANIPULATION
CAUSE OF GRANULATION; ALFALFA AND
SWEET CLOVER THE HONEY-PRODUCING
PLANTS OF THE FUTURE.

By Emerson Taylor Abbott.

I have read with considerable interest Mr. Aikin's article on alfalfa honey; but as his experience and mine are not in full harmony, I wish to make a few remarks on the subject.

There are some things which occur under the operation of what we call natural laws with that unerring certainty which enables us to say positively that they are so and so, but the granulation of honey is not one of them. The reader will more thoroughly understand what I mean when I say that I now have in my possession alfalfa honey of last year's crop which has shown no signs of granulating. I have had alfalfa honey from the same party, Mr. Oliver Foster, of Los Animas, Col., for a number of years, and my experience with it has been invariably the same.

I know that, generally speaking, alfalfa honey granulates very quickly; but I am inclined to think that this is due more to the way the honey is handled than to any inherent tendency in the nectar of the alfalfa plant. I am well aware that there is a wide variation in the body and appearance of the honey found in the open market which is known as "alfalfa." I am not inclined to think this difference results from the locality in which the nectar is produced. I think it was Dr. Miller who offered the suggestion that alfalfa from different localities might show different characteristics; but I hardly think this is true if the honey is absolutely pure alfalfa, and is handled in the same way. I think that the variation in color is due almost, if not entirely, to the fact that the nectar of other flowers has been mixed with that of alfalfa. The "body" and flavor of the honey is due largely to the method of handling it. Especially is this true of the "body," a very important factor in the make-up of a fine quality of extracted honey. I am also of the opinion that the tendency to granulation is largely due to a lack of "body." This is strikingly illustrated in the basswood honey of my own State, when it is thrown out of the combs before it has been thoroughly ripened by the bees. In a word, I incline to the opinion that the great tendency to granulate shown by extracted alfalfa honey is due to improper manipulation, and I would advise the other extracted-honey producers of Colorado to take a few lessons from Mr. Foster, and to work for *quality* rather than *quantity*, and then they will not say that all alfalfa honey will granulate in a very short time. I know from experience that it will not.

I do not think there is any finer honey in the world than extracted alfalfa when it is properly

handled from start to finish. It is the only honey that I have ever seen that can be used for general sweetening purposes without spoiling the flavor and desirable qualities of some articles of food into which it is put. Especially is this true of all drinks, such as tea or coffee, which, by the way, I seldom use.

I look upon alfalfa and another member of the same family, sweet clover, as the honey-producing plants of the future. The honey produced from the nectar of these two plants is very much alike, as is also their habit of growth, even though one is a biennial and the other a perennial. Opinions seem to differ about as widely as to the merits of sweet-clover honey as they do as to alfalfa; and I am inclined to think that this also results from a mixture of the nectar of other flowers with that of mellilot. All of the pure sweet-clover honey that I have ever seen (and I have had considerable experience with it) has been uniformly of the best quality. My experience has been confined entirely to the honey from the white variety. There may be some difference in the honey produced from the yellow or blue varieties. The former runs wild in Great Britain, and we are told that the "herbage is relished by cattle." The latter is a native of Africa, but is cultivated in Europe, and is used in Switzerland for flavoring a certain kind of cheese.

I apprehend that the two plants are sometimes confounded, as there is also a yellow-flowered variety of alfalfa, which is a biennial the same as mellilot. The name, Bokhara clover, being applied to it, tends to confirm me in this opinion, as lucerne is extensively cultivated in that country, and I find no mention of sweet clover as one of its products.

St. Joseph, Mo.

[The alfalfa honey that has been produced for us by W. K. Ball, of Reno, Nev., has been no more inclined to granulate than any other honey. In fact, I believe I should have said that it was less so. The honey that we have received has been of heavy body and of extra fine quality.—ED.]

SUPPOSED GRANULATION OF ALFALFA COMB HONEY.

THOSE HONEY CARAMELS OF DR. MILLER'S;
CREATING A MARKET FOR GRANULATED
HONEY.

By F. L. Thompson.

On page 115 Mr. Aikin braces himself for a thumping. I'm not big enough to administer it, but I'd like to ask a few questions.

Is it not true that there is a marked difference between early and late honey in this respect? Is it not true that early alfalfa comb honey, kept in a warm dry place, will generally pass the winter without granulating? Is it not true that early honey constitutes the bulk of

the crop? Is it not true that there are enough No. 1 sections among the late honey to account for the prevalence of the general idea that alfalfa comb honey candies quickly, and that that idea would never have been formed in the minds of persons who had never bought any but early honey, or in the minds of honey-producers who had taken care to keep the two crops separate? How is it that not more than two cases were candied among 6000 pounds sold in March, 1893, by a Denver bee-keeper? In 1892, 60 lbs. of my early honey were kept until late the following spring before being used up, without showing any signs of candying. Others besides myself have had the same experience. The same season, the late honey was candied before it was taken off the hive. But that was an exceptional year for the rosin-weed Mr. Aikin refers to. (I think its botanical name is *Grindelia squarrosa*.)

Referring to Dr. Miller's suggestion on page 113, I do not think honey caramels are what I am groping after. They may be delicious, but they have to compete with any quantity of saccharine-sweetened glucose confections. But honey itself competes with nothing, in deliciousness, at least, because, so far, nothing in this country imitates its precise flavor. Any kind of honey confections is not honey itself. I am not against all possible uses of honey, but I don't think it pays to make much fuss over them, for the reason that the same amount of energy expended in extending the consumption of honey itself pays far better.

The children of my customers got tired of honey just as quickly as adults, if I may judge by what was told me.

Referring again to Mr. Aikin's remarks on marketing extracted honey, here is some unexpected and very important confirmation, from a Colorado bee-keeper: "We put about 8000 lbs. of extracted honey on the market, in lard-pails, last year, and think it the best way we have found. The three-pound lard-pails hold five pounds, and the five-pound size seven and a half of honey. We fill them from the extractor, and let them granulate, then put on a neat label with instructions for liquefying, and state that Colorado honey will always granulate if pure. Three years ago we could hardly sell a pound of it granulated. Now we can not produce enough to supply the home demand. This last year we have had orders from several towns and many other places, and not one complaint."

Now, who says it does not pay to sell granulated honey? I don't think it comes very near the truth to say that "people never read labels."

Does not the distrust of marketing granulated honey arise from allowing the honey to granulate in the hands of the consumer? Has anybody ever made a fair trial of selling honey

after granulation, and failed? Let him hold up his hand, and tell us why.

The above was written before Geo. L. Vinal's article came to hand. I see he says, "Not half of the people read the directions." But whether they do or not, how did those four tons of granulated honey get sold in one district? When people buy granulated honey, they can't help knowing what they are doing; but when they buy something that needs careful explanation *afterward*, we all know how many of them will be so smart that you can't tell them any thing.

Denver, Col., March 23.

HOW TO KEEP INSECTS OUT OF COMB HONEY.

By Prof. A. J. Cook.

Your inquiry from H. Price Williams, forwarded to me, has awaited opportunity to answer until now. Mr. Williams wishes to know if there is a paper made that is absolutely insect-proof. He says he wants something that he can wrap cases of comb honey in so that it can be kept until sold. Mr. Williams states that in his region (Miami, Florida) red ants and every other conceivable insect abound in inconceivable numbers.

The problem which Mr. Williams sets for solution is very much the same which confronts us who make collections of insects and plants for our cabinets. There is, however, one difference in the cabinet—we are not careful to avoid ill-smelling substances which might be detrimental to honey. The first way we fence against insects in our cabinets is to use boxes which are so tight that no insect can gain admittance. I know from quite a long experience in producing and keeping honey that the same means may be successfully used in protecting our honey from our insect-marauders. A good way to make a cover that fits tightly (of course, there is no difficulty in making a perfectly tight box), is to set a rubber in a groove so that the cover will press upon it when closed. This is cheap, and absolutely efficient, as I have proved. I believe this would be the cheapest way to protect honey and also combs from insect depredation. We also find that certain substances like naphthaline, carbolic acid, and kerosene oil, are so offensive that their presence is almost sure to keep the insects from making an attack upon our museum specimens. It might be, however, that these substances would injure the sale of the honey, and so they should be tried before being generally adopted.

I think that, in most cases, simply wrapping such packages in paper will prevent insect attack. The thing to be sought is to keep the odor of the honey from passing through the paper so as to attract the insects. This might make it necessary to seal the package hermeti-

cally. To do this the bee-keeper has an easy method right at his hand. He has only to dip the paper in hot melted wax, getting just as little wax as possible on it. Then if he wraps the sections while the wax is a little warm he will so seal the package that no odor of honey can escape, and so the insects will not be attracted. I should have great confidence that this would work, but of course it would have to be tried before we would warrant it. I should also have great faith if we used paraffine instead of the beeswax.

California is much like Florida in this respect. The climate is so delightfully genial the year round, that it is a perfect paradise for insect life. The ant is on deck, gay and festive, every day of the year, and thus ever ready to become a nuisance in pantry or storehouse. For this reason extracted honey is more suitable for production in California than is comb honey. This is another reason, then, why the California honey-producer may well turn his attention to the production of extracted rather than comb honey. When the honey is thoroughly sealed in the tin cans it is entirely safe from any such molestation.

Claremont, Cal., April 1.

[I know that bees seem to have an aversion for paraffine paper, or, in fact, of any thing paraffined; and I was under the impression that certain other insects seemed to show a dislike to its slight flavor of kerosene. A package of comb honey can be wrapped in it, I am told, so that it may be sealed hermetically by placing a flatiron over the folds until the paraffine melts, when the iron is released.—ED.]

BEES AND GRAPES IN CALIFORNIA.

VALUABLE TESTIMONY FROM ONE WHO PRODUCES HONEY BY THE 40 TONS AND RAISINS BY THE CARLOAD.

By G. F. Merriam.

In the discussion of the "bees and grapes" question in the papers, I have waited, hoping some one else in this State would take up the subject; but as no one has done so I will give my experience, which runs through 16 years.

I happen to own a vineyard planted in 1880 to the raisin grape and wine varieties. I have kept from 100 to 500 colonies of bees within $\frac{1}{4}$ to $\frac{1}{2}$ mile of this vineyard all these years, and have made raisins by the carload, and honey in 30 to 40 ton lots at the same time; so I presume I may write understandingly.

One year I shut my bees in their hives four to five days at a time, releasing them for an hour or so just before night, closing at daylight the next morning; but it was a useless labor, because bees came from every point of the compass to do the same work I tried to keep mine from doing. My experience tallies exactly with that of the Dadants and others, who own large vineyards—that bees never touch a fresh grape

until the skin is broken by birds or some other means.

In raisin-making, the grapes are laid on trays made of thin shakes 2x3 feet square—each tray holding about 20 lbs. of fresh grapes, laid one layer deep only. In the picking and laying out, more or less of the grapes are slightly loosened from the stems, whence a tiny drop of the sweet juice comes out; and as the trays are laid out on the drying-beds, or in the rows between the vines, the pickers are followed by a swarm (almost) of bees, which run over the bunches and speedily clean up all of these little drip-pings.

Within ten minutes after a tray is laid out to dry, all the bees have left it and gone to the next later picked, and so they follow the gang of pickers day after day.

The bees let the grapes alone then for about ten days. When the upper half of each bunch of grapes has turned brown, small wrinkles appear in the skin of the grape. As long as these bunches remain dry, the bees let them alone; but if a heavy dew or fog or light shower falls on the grapes, early in the following morning, while the skin is yet wet and soft, and while the grooves in the skin furnish a chance for a bee to get hold, they will tear open the skin of a few of the sweetest grapes, and for several days from three to fifty bees will be seen on that bunch, patiently eating away at the half dried grape, and keep at it until only seeds and skin are left. A good-sized bunch will keep a gang of bees busy over a week before it is all gone. The bees act, while eating these grapes, as if they were eating candy. They get quiet, and act as if half torpid, and scarcely fly when brushed off.

The loss to the raisin-maker by this is not very material—furnishing only a little more offal when run through the grading-machines, which are large fanning-mills arranged so the sieves sort out and drop the different sizes of raisins into separate boxes.

In wine-making, if conducted outdoors, the crushed grapes attract the bees in clouds, and force the wine-maker to do the crushing in a house.

The year 1894 was exceedingly dry here; and by fall, when we began making wine and raisins, there was scarcely any honey left in the hives, so the bees carried in the juice, which dried in the cells into a brown, sugary mass. This juice was placed around the brood, the same as honey, and the next spring these combs in colonies that had become disgusted with the sour ill-smelling stuff, and gone off to hunt a sweeter and better home, were unfit to use without cutting out this candied grape juice. In most instances the bees carried this out like candied honey; in others it was cut out and rendered for its wax. I think it is a detriment for bees to have access to grapes in quantities

sufficient to more than meet their daily wants. That bees will live and breed and do fairly well on fresh grape juice alone, in a season of drouth, I am certain.

Three Oaks, Cal.

[Your testimony is very valuable, friend M., and our only regret is that there are not more such men as yourself who are willing to give from their store of practical experience.]

It is pretty well settled now that bees do not themselves puncture fruit, although we have to admit that they often help themselves freely to that which has been broken in handling or which has been punctured by birds or other insects. Although the bees do bother in raisin-drying time, it is evident that friend Merriam manages to produce raisins and honey simultaneously, without any very great inconvenience. This goes to show that the damage on the part of the bees can not be very great. That being the case, the honey-producer ought to be able to make some reasonable and fair compensation to the raisin grower in his own immediate vicinity. If the damage is only slight, a very moderate compensation would suffice. We shall hope to hear from friend Merriam again.—Ed.]

"CAN EXTRACTED-HONEY PRODUCERS AFFORD TO BE HONEST?"

A TEXAS BUG-RAISER'S OPINION.

By W. W. Somerford.

I see in GLEANINGS, page 193, the question raised, "Can extracted-honey producers afford to be honest?" I say, yes—surely they can if the chance for cheat and rascality lies along the line of glucosing honey in order to get a little more out of a crop; for unless they can beat me selling honey in the way of *getting a good price*, they would be left buying glucose at the price it brings down here (taking it home, and mixing the stuff in). Hauling, handling, and paying freight on the stuff would more than cost the *little possible gain* a chap *might get*.

My experience has taught me that people who buy honey know just what it is. I used to be so well up on peddling honey that I fancied I could tell a would-be customer at sight. Just one good look at his face generally told me whether there was much chance to make a sale or not. Then when the question comes to an honest man, with an honest man looking him *square in the face*, "Is your honey absolutely pure?" what kind of stuff would a fellow be who could face an honest man and sell him glucose to take home to his wife and family for an *extra treat*?

Peddling, I am sure, would be the only chance for a fellow to make way with a honey and glucose mixture; and as peddling is something bee-keepers who produce honey in large quantities won't generally do, except in drummer style, there is not any danger of glucosed honey being sold by bee-men in quantities. I have sold honey often by the barrel, to grocers who

would conduct their mixing experiments (with me present) before purchasing; and I am sure there are not many honey-eaters who can't easily detect 25 per cent of glucose in ordinary honey, taking ordinary glucose to make the mixture.

So, in conclusion, I will suggest, that, if a man has energy enough, with sagacity enough (mixed in) to sell glucosed honey at a profit, he is amply qualified to go at and make a success of some business that will pay him many more dollars, and give him much more satisfaction than he could ever get peddling out a fraud to his neighbors. A good bee-keeper can make \$300 or \$400 a month during the time he has his bees to attend to, and it would take a hustler with glucosed stuff to clear \$100, or even \$50 a month.

Navasota, Texas, Mar. 28.

[I am glad you have answered the question in the affirmative; but I do not believe I could agree with all you say. I wish it were indeed true that all glucose mixtures, if disposed of at all, would *have* to be sold by the laborious and disagreeable method of peddling. But I am afraid many consumers are so gullible, and so unfamiliar with the real flavor of pure honey, that they get the glucosed honey without the medium of a honey-peddler. They buy it right in the open market because it is cheap and "looks nice."

I once took the ground, as you do, that there were not very many honey-eaters who could not detect 25 per cent of glucose in honey. While I now believe that ordinary commercial glucose can be recognized in such quantities, I know there is a *fine* quality that could not be *certainly* detected when used to the extent of even 50 per cent as an adulterant. Generally speaking, however, I believe it may be true that one who knows the flavor of good honey could detect the ordinary commercial glucose even when only 10 per cent is used—at least, that was my experience if I may call myself an expert in glucose-tasting; for you may remember that, two years ago, I was able to detect, almost unerringly, by the mere taste, glucose mixtures of 10, 25, 33, 50, and 75 per cent, and, in most cases, the approximate percentage of adulteration, just by the mere taste. But the glucose used as an adulterant was the commercial article, the brassy metallic taste of which is very pronounced, even in small percentages of adulteration.—Ed.]

FANCY COMB HONEY.

ARE THE GRADING RULES IN FORCE TOO RIGID?

By T. F. Bingham.

On page 45, present volume, I notice objections to the present plan of grading honey. An old adage is, "He builded wiser than he knew." That is the upshot of the present grading. Said plan contemplates only the benefits accruing to the bee-keeper having honey to sell. Nothing is best which is not good for all.

The conditions which render the grades fancy are not merely the looks and appearance but the quality. It is true, that irregular thick-

nesses of combs do not impair the quality of the honey, which, though ill formed, has been made under the same practical conditions] as that which has been stored according to the higher art of modern bee-keeping.

The word "fancy" means, as used in grading comb honey, vastly more than is shown. It means the best honey stored when that particular crop or flower product was approximating its climax, and not its decline. The combs are white, made of *new wax*—not of old gnawings brought up before new wax was secreted. The corners were filled out because the honey-flow was strong; capped up because the honey was ripe and ready to cap.

Honey made under such conditions should bring more money than honey put up in drawn combs, half of which has been brought up from the previous years' gathering, to make room for brood, and capped with scraps of propolis, or left uncapped along the edges. When exposed to cold and damp, it has undergone such changes that it is made faulty in other respects than in appearance.

Were it possible for the bee-keepers to raise the fancy or best honey, and market it directly to the consumers, only a very short time would be required to establish a market almost without limit for fancy honey. The consumer would soon find that *fancy* meant more in the *selection* than the word "honey" implies. It is from the general meaning of the word honey that consumers lose their appetites for it. "Fancy" honey stimulates the appetite and increases the demand.

Farwell, Mich.

[Mr. Byron Walker, and some others, take the ground that the "Fancy" in the Washington grading is drawn down too fine. In fact, Mr. Walker once advertised that he would pay a dollar a pound for all honey that would be sent him conforming *exactly* to the requirements laid down in the Fancy. He says he was perfectly safe in making the offer, for he never got a pound. Mr. Bingham's point, however, is good, a *fancy* article of honey should be *fancy*. Perhaps the trouble is our description for that term is not comprehensive enough. —Ed.]

WHAT ABOUT THE SELF-HIVER ?

HOW FAR WAS IT A SUCCESS ?

By C. H. Dibbern.

Somehow a strange silence seems to have settled on the self-hiver of late, and I suspect none of the various inventions have proved very successful. Judging from my own experience, extending over a number of years, I should say that the perfect self-hiver is an impossibility; and yet the impossible of to-day may be the accomplished fact of to-morrow.

□ No doubt many a bee-keeper, having an out-apiary or two on his hands, is anxiously looking for something of the kind—something, you

know, that will hive the swarms when they issue during his absence, change over the honey-cases, remove old colony to a new place, etc. One man wrote me that he wanted a hiver that he could put on his hives in the spring, and place the empty hives, provided with honey-sections, on them; and when he called around in the fall, to find the swarms all safely hived, honey-cases all filled, and every thing lovely. That would be very nice, and almost any one could go into bee-keeping, and make it a success.

Now, the trouble with all self-hivers is that where bees issue out from the hive they will also return again when they miss their queen. If the queen is trapped in a new hive, or in a queen-trap, only a handful or so of bees will remain with her; and if more bees are not given her within a few days, she will either die or get lost in some other way.

My latest device, as described in GLEANINGS, has proved reasonably successful in my own experience. If I am present when the bees swarm out, I have only to close up the direct entrance; and the swarm, upon their return, finding their queen in front of new hive, and no way to get back into their old hive, have no choice but to go into the new hive. In this way I get good-sized honey-gathering swarms, and I usually change over the surplus arrangement at once, but it will not do to leave the old hive more than a day or two without giving them a direct entrance of their own. At first I thought it would be a nice thing to allow the bees from the old hive to reinforce the new swarm for a week or two; but I soon found that perhaps, for want of water, the bees in the old hive would destroy the unsealed brood, and in about two weeks the hive would contain nothing but comb and a very few bees. The new colony would prosper greatly, however, and possibly this may be a point for those bee-keepers who want no increase.

The main advantage I claim for my device over the queen-trap is that, when a swarm issues during my absence, almost any member of the family can take a smoker and close the entrance to old hive; and when I return in the evening I find the full swarm nicely hived, and can then fix them in a moment to suit me. With the drone-trap I should have to divide the bees, as but a small handful would be found with the queen in the trap.

Some of the drawbacks I have discovered are that the bees dislike traveling the whole length of the new hive before they can fly. They are also liable to become sulky, and try to gnaw holes where the bridge covers the space between old and new hive. Still I believe I can overcome these objections by a more perfect arrangement, and allow more space through the zinc—four rows of perforations instead of two; but further experiment-

ing is necessary to make it an entire success. Until we have something better, bee-keepers had better stick to the Alley queen and drone trap for hiving-purposes. Indeed, where one can be present, or have some competent person there when swarms issue, nothing better can be desired. With my arrangement I usually allow the bees to swarm out once through the swarming-device, and return before preparing the new hive to catch the swarm. This saves much work in preparing new hives for each colony, many of which might not cast a swarm at all. As the back of my device will allow bees and queen to pass, but exclude drones, I cover it with wire cloth when used as a queen-trap. This enables me to see readily when a hive has swarmed during my absence.

I have no patents or swarmers for sale, and the above is written simply to show what progress has been made.

Milan, Ill.

[The self-hiver (the Pratt) worked very well with us. Several summers ago it hived over half our swarms; and while I was pleased with its working at the time, it required special fixtures, some tinkering and patience to make all go right. I am not sure it was very much ahead of entrance-guards or the Alley trap.—Ed.]

BEE-ESCAPES.

HOW THEY SAVE TIME, AND PREVENT ROBBING.

By F. A. Snell.

The bee-escapes now in use are of much value, and I would not think of doing without them, even if the cost were much more than it is. Every apiary should be supplied with them. There are times when I do not care to use them very much. In removing surplus comb honey, if this be done during a good honey-flow, I simply remove the supers from the hives and place them to one side in the beeyard, in the shade, and in a short time the bees will have left them, and I then carry them to the honey-room.

In extracting honey under the same conditions as to honey flow, the work can be done by the shaking-off plan very well; yet for this work I rather prefer to use the escapes, as it causes less confusion among the bees, and their work is not retarded in the least; and I think the work of the operator is thus made more pleasant. It is essential that the escapes be put under the supers to be emptied 24 hours, or the day before the extracting is to be done, so the supers may be clear, or nearly clear, of bees. With all colonies I put over the brood-chamber a super of empty combs; the escape on top of this, and the filled super over this. By so doing, the bees have abundant room in which to store the honey being gathered, and seem to leave the upper story a little sooner. Another advantage is, that none of the newly

gathered nectar is in the supers to be emptied, which would be the case where only one super is used and the shaking-off method practiced. This gives us honey of a little better quality than if the escape were not used, and no pains should be spared so slight as this to better the grade of honey. The above applies to times of good honey-flow more especially. With us these occur during warm weather, when, if the honey be cooled a little by the exclusion of bees, no inconvenience from this results. Later, as the honey-flow begins to slacken or is closed, comes a time when the escapes pay their cost very quickly, to the delight of the apiarist. Before the advent of the escape, taking off surplus at such a time was very unpleasant work, and required the best efforts of an expert to keep from demoralizing the whole apiary, especially when extracting. Now all this is changed, and an unpleasant task made easy, by the escapes. Thanks to inventive genius.

During a time of scarcity we do not in our apiary take off any surplus except by the aid of these. The supers are simply raised up (using a little smoke to keep the bees under control), the escapes placed, the super set on, and we pass on to other hives until each super has been arranged as described. The comb-honey cases will be cleared of bees in a few hours, and can be removed and taken to the honey room. The extracting supers are managed the same, only a longer time is needed to get the bees out of these. Thus hundreds of pounds of honey can be taken from the hives, and at the same time perfect order reigns throughout the apiary. Work goes on in perfect order. How different from the old way, under same conditions! The air was then filled with robber and angry bees stinging each other, and by no means neglecting their owner. I have used the Dibbern, Hastings, and Porter escapes. The Porter has proved to be the best one, after a thorough comparison. The bee-escape has come to stay as a boon to bee-keepers, and one of the most useful implements. Milledgeville, Ill.

[Our experience has been almost identically yours. I can not conceive how any one can prefer the shake-off brushing plan to the bee-escape method. To shake the bees off the comb causes more or less spilling of honey not yet ripened down, and for an hour or so that colony is so completely broken up that honey-gathering is entirely suspended. After crawling into the hive, if they do not stop to do it before, they have to lick each other off; then if it is during the robbing season there are plenty of other bees that are prying their noses into the other bees' business; then the shaking and brushing necessarily results in killing and maiming a few bees at least, and the possible loss of the queen; and, moreover, it requires a large expenditure of strength to shake the bees off from every comb. My last experience resulted in blistering my hands and giving me a lame back for several days afterward; and I vowed then and there that for me, at least, the bee-escape should be hereafter used.—Ed.]

HONEY VINEGAR.

WHY IT "EATS" PICKLES; HOW TO MAKE GOOD HONEY VINEGAR; WHY IT CAN'T COMPETE WITH THE VINEGAR OF COMMERCE; A VALUABLE ARTICLE.

By E. Whitcomb.

On page 234 Mr. C. Davenport complains that honey vinegar eats or softens pickles. This is not necessarily the fault of the material of which the vinegar is made, but because the vinegar is too strong. Vinegar made from any other material, and of double strength, will soften or eat pickles; and we think if Bro. Davenport will reduce his vinegar with water nearly a half, or to about forty-grain strength, he will not complain of its eating or softening pickles. One pound of honey ought to be sufficient to make one gallon of good vinegar. However, its strength is entirely regulated by the amount of material used; and it can be made of triple strength, or about ninety grains. Where an inferior or low-grade honey is used, the fluid, before it is finished, should be run about twice through a generator, during which process it should pass through bone charcoal.

I have been unable to notice any material difference in the strength or flavor of vinegar where the generator process is used. Of course, dark honey will make a darker-colored vinegar, while the lighter honey will make an article almost as clear as water.

A honey-dealer in Ontario wrote me, after the Lincoln convention last fall, inquiring why we did not manufacture honey vinegar, and thus create a market for low-grade honey. The vinegar of commerce doesn't cost, for the material there is in it, to exceed one cent per gallon, either made from corn or any of the cheap syrups, and sold on the market as pure cider vinegar; and it can be made pure without any acids or adulterations at the above price, barring the labor of making it; or, in other words, the barrel costs more money than the vinegar which it contains.

There is no article of universal use in the household, upon which the general public have so little information as vinegar. The whole secret of vinegar-making quickly hinges upon how much you can expose the fluid to the air at a temperature of seventy or more degrees of heat; and good vinegar may be made from cider, honey, or syrup, within the space of 24 hours; and the reason that we can not make vinegar out of honey, and thus create a market for the low grades of honey, is because no one will sell his honey at less than one cent per pound. If he did, honey vinegar would go into competition with corn and syrup vinegars.

This is not material with the man or woman who has a few pounds of inferior honey which they desire to convert into vinegar. We would use one pound of honey to a gallon of soft

water, setting in an open barrel, and covering with thin cloth to keep out insects and dirt; and after the barrel is filled we would add a gallon of good yeast to every barrel, stirring up occasionally for the first three weeks, when the result will be very good vinegar. When sufficiently strong, draw off with a siphon, such as can be drawn without sediment, and make the second barrel in what is left in the barrel, and you will find that the second lot will make much quicker than the first.

Of course, the strength of the vinegar will be gauged entirely by the amount of honey used. Vinegar is an industrious fellow; but when he has used up all the materials you have given him to work on he will stop; nor will he stop until he has accomplished this.

Of course, it must be borne in mind that a temperature of above 70° must be kept up, either by the sun's heat or by artificial means, during the process of making.

Friend, Neb.

HOW I SOLD HONEY.

SOME OF THE DISAGREEABLE FEATURES OF THE BUSINESS.

By Alice Harding Crossman.

While I was very busily engaged preparing dinner I heard a loud knock. I opened the door, and found a tall gaunt old man, apparently a gentleman:

"Have you honey to sell?"

"Yes, sir."

"What kind?"

He waited at the door while I brought a sample. Then he gave me a lengthy description of his physical condition. He had nervous dyspepsia. Did I think honey would hurt him? I told him it would do him good. I could smell something burning. I darted into the kitchen, and found the potatoes burning. When I returned, the man had decided he would take half a pound if I could let him have a can to put it in. He hastily explained that he would find if it agreed with him. I found a baking-powder can. Guess I had better get a supply of old cans if my business keeps like this. Dear me! a whole nickel's worth! I knew this old man was very rich. Five cents wouldn't pay for the time I had lost and those potatoes! It will be better soon, I thought, as I set the table. Shortly after dinner I opened the door to see a gentleman, really and truly a gentleman. He stood with hat in hand. "This is Mr. —'s place, I believe?"

"Yes, sir."

"I wish to get \$1.00 worth of honey."

"Do you wish to see it?"

"No, I know the honey. Can Mr. — deliver it?"

"Yes, sir."

He gave me his card, and, with "good-day," walked away.

"Now, he is a daisy. Yes, sir; if all of my customers were like that."

But I noticed the address was that of an old customer. After all, the sign had not brought this one.

I had just reached the baby when another knock. A German this time, with a large sack of beeswax. He said he wished to sell. But Mr. —, I knew, didn't want it.

"Vel, I leaf it here; he take it."

He put the sack down, and asked questions about the sign and honey. At last he went away. Not another customer came that evening. I felt glad.

The following morning I was hoping no one would come, when, rap, rap! and there was an old man with a ten-pound lard-bucket. He came in, and told me how much he paid for honey during the war. He at last told me he wanted honey, but wanted to taste some of it first. I went into the kitchen. He followed, and sat down. I gave him a "taste." He thought it was not as good as honey he bought during the war, and we asked too much for it. He said he would take ten cents' worth. When I weighed it the bottom of the bucket was scarcely covered. He seemed content to sit and talk.

"I can't waste my time," I thought. I proceeded to skim my milk. Then he gave me full directions how to make butter, and also gave me all the "inside secret in raisin' bees." Yes, he was very wise.

I had finished my milk before I opened the door for a little boy who wanted honey for his ma, who had a bad cough. I filled his cup, and he departed. After receiving another lecture from the man in the kitchen I found he was really going to leave. Then I found a little time to get dinner. I was trying to finish washing the dishes, when I heard a knock. I hastened to the door. Four ladies, handsomely dressed, stood on the porch.

"Will you come in?" I asked.

"Yes, thank you, we have time," one said.

They filed into the parlor. When they were seated they began to talk. Yes, they were very talkative. At last they decided to buy a fifty-cent bucket of honey. It took them just one hour to decide. Oh how glad I was when they went away!

I had just put the baby to sleep, when knock! It was for two young women this time that I opened the door. They had such merry laughing faces I said, real pleasantly, "Come in."

In they came, and sat and talked until sundown; but they bought two bits' worth of honey. I laughed as they rode away on their donkies; but my head ached so bad I concluded I was tired of selling honey.

The next morning I found I was sick. My husband went for a colored girl. When she came I said, "Millie, do the best you can."

After a good nap I felt better. I thought I would go to the kitchen; but while I hesitated, there was a knock at the door.

"Go quick, Millie," I said to the girl. She obeyed, and came back followed by the strangest looking woman. She stood staring at me. Millie looked at me and grinned.

"Good-morning," I said.

After a little she said, "Mornin'! are you sick?"

"No, not much," I answered, smiling.

She was very slender; her face was small, and had a pinched expression. She wore an old-time short-waisted calico dress. She wore a hat—ah that hat! It was almost as large as a peck measure. I never did see any thing like it before. It seemed to be made of shucks. It was lined with green silk, and the outside was loaded with green ribbon and bright flowers, with huge bows of bright-yellow bunting. The poor little head looked miserable under that hat.

"I come to git some honey, fur I seed you had some to sell. I wuz goin' by, an' I jest thought I'd get some. I live 'way up in the forks of the river. I'd like to get some honey if ye'll let me. have a bucket to put it in. I don't want but a dime's worth."

On she talked in a queer, squeaky voice. I wondered if she would ever stop. She told me—I think she exhausted her supply of words—that she had determined in her mind she would get a bucket. I at last said:

"Go out to the honey-house; and if Mr. — is there, ask him about it."

She went, but she bought a bucket and the honey. She came back through the house.

"I got me some honey. I jest thought I'd come back an' see if you knowed of anybody what wanted work done. I don't want hard work, though."

"I will let you know if I hear of any one who wants you," I replied. "Did you say Mrs. Beat or Miss?"

"I'm a young lady—that is, I ain't married yet, but guess I am old 'nough, though."

With a few more explanations she then decided to go.

"Fo' de lan' sake! did you eber see de likes ob dat?" Millie said, laughing.

"No, I never did," I answered.

The following day I was myself again, and was determined not to feel worried. I was making my light bread, thinking how brave I would be, when bang! bum! bum! some one was trying to knock down the front door. I tried to get the dough off my hands. Open went the door. In came that horrid old man, carrying his fruit-jar half full of honey. "Gracious! what can he be bringing back that

honey for?" I asked myself. He came blundering along.

"Got more honey?"

"Yes, sir."

"Then fill up this jar."

"Why," said I, "you haven't used—"

"No, but I was comin' back this way, and I was afraid I'd get out," he said. "But go 'head with your fixin's; I can wait."

I finished my bread, and he talked on. Then came the fun of filling that jar. He could not tell how I was going to know how much honey I had sold him. At last I made him understand. The honey was ready; he could go, but he sat down and talked about his chickens, his cows, and calves.

When he went away at last I was determined to have that sign taken down. "I must quit trying to sell honey, or go crazy. It might do in some places, but not here," I thought.

In the evening three men came horseback. They had been drinking. I was nervous when they left, and was glad to have the company of a woman who had come to buy ten cents' worth of honey. When my husband came in that night he asked innocently:

"How is the honey business?"

I just gave up and said, "I am tired; take down that sign. I just can't sell honey this way, and be tormented so. They don't come, buy honey, and go away, but they make me waste my time, spoil my cooking, neglect the baby, and scare me half to death."

How the partner of my joys did laugh!

"I thought you would get tired."

"Well, I tried, but I can't keep house and sell honey."

PETTIT'S NEW SYSTEM OF PRODUCING COMB HONEY, AGAIN.

A REPLY TO BRO. DOOLITTLE.

By S. T. Pettit.

Brother Doolittle, I was pleased at your kind reference, on page 119, to my article on page 51; but you did not seem to see that I was not discussing the question as to whether the field-bees go right up to the supers and deposit their loads of honey in the cells, or whether they hand it over to younger bees who do the depositing. However, I did not intend to say any thing at variance with the fact that field-bees *generally* give their loads of honey to younger bees; but I am not so sure that they always do so under all circumstances.

Possibly you will point me to what I said in the following: "Now, as the bees come in they generally go up somewhere near the center; and as they find the sections advanced well nigh to completion the honey must go beyond." Well, I confess I might have been more specific

if I had thought it necessary. We say the sun rises, the kettle boils, John Smith is building a house, when in reality he has let the job to a builder, and he neither pushes a plane nor drives a nail. But why, under my system, do bees fill and finish the outside sections as rapidly and as well as they do any other sections in the super? is the question at issue. Let us consider the matter.

THE EFFECT ON THE SUPER WHEN THE HIVE IS UNDER A SHADE-TREE.

We all know that, if a hive of bees be placed under the side of a spreading tree or under any other obstruction, so that the bees all come in at one side of the entrance, said entrance being the full width of the hive, the work will progress more rapidly on that particular side, whether working for comb or extracted honey, than on the opposite side. The facts are simply as follows: Where the bees go in and up, there the young bees will in a measure congregate to meet them. If they go in and up at the center, the young bees will congregate there, and the outside sections will be more or less neglected; but when the field-bees distribute themselves, and go up at the sides and rear end of the hive, the young bees distribute themselves also to meet the field-bees where they go up; and as the dividers (see page 51) preserve a double bee-space, or, rather, two bee-spaces, at the outsides, room is provided and preserved for a double portion of bees—a nice little cluster along both outsides of the sections, and so the work at the outsides keeps pace with all other sections in the super.

Right here I may be allowed to make the claim that, under this system, more honey, and that in better shape, can be taken than under the old way of either comb or extracted honey. I do not use dividers for extracted honey, but I use the wedges for distributing the bees.

Brother D., what you insinuate about my bees being weak, or what you say about their getting strong enough, needs no reply further than to say that they are strong enough, and ready the year round, to take any crop of honey that may come along. I have no trouble in building up every spring; and, further, my hives are so constructed that the section supers will hold 36 sections each; and when the clover season sets in I put on these big supers, and the bees are glad to go up to get "standing" room. Of course, I select the strongest for comb.

Your caution about stretching the bees over too many sections will do good; but after all it is also a serious and losing mistake to fail to give the bees room according to their strength and the honey-flow.

To several swarms last year I gave 72 sections each in the start, and to some I gave 108. It is only fair to say that the latter got some bees from other swarms, and all the sections in these were well finished. But it is better to

give too few than too many; but who can tell, sometimes, just what to do?

Belmont, Ont., Can., March 10.

[I didn't see it so strongly at first; but the more friend Pettit has to say regarding his new system the more I am convinced that he has got hold of a valuable idea. It is well worth a trial by practical comb-honey producers as it will cost very little. The plan is given on page 51 of our Jan. 15th issue.—Ed.]

J. VAN DEUSEN'S DEATH.

We have to record the passing from earth to a wider sphere of usefulness the veteran Justus Van Deusen, in the eighty-third year of his life.

We do not know what heaven is like; but we have a right to assume that those qualities of heart and mind that we are commanded to cultivate here will, under perfect direction, find wider scope and more ample employment in the hereafter. We rejoice that our friend was spared the period of decrepitude that usually falls to the aged. Attendants at our national conventions, no matter how distant, have usually found him present, displaying the vigor of body and mind of men a score of years his junior. His presence was delightful, and a visit with him was an incentive to the ways that lead upward. As his nephew, Capt. Hetherington, well says, he was a fine example of the Christian gentleman.

From early manhood to 1848 he was engaged in the jewelry business. In the year following, the Van Deusen family built the woolen factory at Sprout Brook, which he ran for many years until he converted it into a comb-foundation factory. He was a fine mechanic, and was satisfied with nothing but the highest grade of material and workmanship. It is but justice to say that every skein of yarn and every foot of foundation turned out from his factory had worked into it the trademark of his life—the best. From small beginnings, because of the prejudices of bee-keepers against the flat-bottom cell, the trade in this foundation has steadily increased to large proportions; and the greatest tribute ever paid Mr. Van Deusen's good judgment, is the recent adoption, by the most extensive manufacturers of bee-keepers' supplies in the world, of the flat-bottom cell in their highest grade of improved foundation.

He was the father of the late C. C. Van Deusen, the originator of several valuable inventions in bee-keeping, and whose tragic death, together with his wife, on their way to the World's Fair, so shocked the bee-keeping world.

P. H. ELWOOD.

Starkville, N. Y., April 13.

[Photo of J. Van Deusen has not come to hand. We will try to give picture in our next.—Ed.]

THE NEW DRAWN FOUNDATION.

ARGUMENTS IN ITS FAVOR FROM A STRONG MAN.

By P. H. Elwood.

You are to be congratulated on the success of your deep cell foundation. Should you never make it a commercial success it is a great mechanical triumph, and calls forth the highest praise from all fair-minded persons. I showed your first sample to Capt. Hetherington, and he pronounced it *wonderful*—quite a contrast to the dog-in the manger treatment it receives from certain sore-headed persons. Many of those who have in the past used and sold heavier foundation than your deep cell now find that there is entirely too much "gob" and "fishbone" in yours, where a part of the wax is taken from the septum and put into the side walls.

Some of us for years have asked bee-keepers and dealers, as a matter of principle, to abstain from the use or sale of thick foundation for surplus. What we have failed in accomplishing by appeals to the conscience, you make plain by one little jab at the pocket-book. "Great is Diana of the Ephesians."

One of the chief merits of flat-bottomed comb foundation for surplus is the fact that it usually contains less wax than the natural base as built by the bees. The greatest objection to it with us is that the bees, during a scarcity of honey, will gnaw it more than the thick foundation. Occasionally they will remove the entire side walls, leaving only the plain sheet, after which it is entirely worthless except for remelting. What is needed to prevent this destructive work is a higher side wall, say one of a little less than $\frac{1}{8}$ of an inch in height. Whether a side wall of sufficient height and thinness can be put on with a roller machine I can not say. I would not care for deeper cells than is sufficient to prevent gnawing. A deeper cell will cost more, of course, and, except for bait comb, is not needed; for with this start the average swarm will complete all the comb necessary to store their honey. Then, again, this depth of cell could be readily transported, while the deeper would be very bulky, and liable to injury. For bait comb and other special purposes there will be a demand for the deeper, if such can be made successfully.

I had written so far when the April 1st GLEANINGS came with the editorial on the deep-cell foundation, and I consider it complimentary to me that we so completely agree on nearly every point presented in this able article. Especially would I emphasize the fact that drone comb is usually thicker than worker. I have also noticed that both drone and worker are much thicker when built in large sheets in the brood apartment than when built in the small surplus-receptacles. It is also a fact that

drawn-out comb licked clean after extracting is much harder than the same set away covered with honey. In the latter case, however, the honey stored in them is much more liable to candy. Before the production of flat-bottom foundation, and when foundation for surplus probably weighed fully twice what it does now, Mr. J. E. Crane, of Vermont, visited us. He sunk the knife into a plate of honey, and, on meeting much resistance at the midrib, looked up and said: "Do you use foundation in your sections?" I answered, "No." Again he pushed, and again he looked up with inquiry, surprise, and I mistrusted doubt, written on his countenance. The section of honey he had sampled was probably a bait comb wintered over, and drone.

For some years we have used in our surplus the Van Deusen flat-bottom foundation weighing not less than 12 ft. to the pound, and we have been spared any experiences similar to the above; for on the average our honey has less wax in it than natural comb honey. To disarm criticism, and because wax used in making foundation is not of as good quality as the newly built comb, I prefer to have the base somewhat thinner than the bees make it.

The samples from your new machine are just received and show a marked improvement over the first. With my present knowledge, until a thorough trial proves me wrong, I prefer the sample with $\frac{1}{8}$ -inch side walls, and weighing 12 ft. to the pound. This must prove very acceptable to both bees and consumers. The part of the side wall that the bees sometimes neglect to thin is at the very bottom, where it is attached to the midrib. I notice in your samples that this part shows no greater thickness to the naked eye than the remainder of the cell wall. The cell walls and septum of these samples are so thin, and the quality of the wax is such, that, after repeated trials, I have not succeeded in chewing a mouthful into a "gob." Thick foundation made of poor wax has the "gob" at both start and finish. I do not wish to flatter you; but I believe you have the most valuable invention of recent years in bee-keeping.

I do not share the opinion of some, that this invention, nor any thing else, will stop the production of extracted honey. Comb honey can not take the place of extracted for hot cakes and other domestic uses; also large quantities are used in the manufactures. The proposed tariff on sugar will soon increase the wholesale price of extracted honey, while the retail price in the home market is usually two-thirds the price of comb honey, and a much greater quantity can be retailed of the former. Allow your honey to remain on the hives until well ripened, and you will have no trouble to dispose of a large quantity.

Starkville, N. Y., April 20.

[After such an able article as this it is unnecessary for me to add any thing; for the writer shows that he knows what he is talking about. It is well known that Mr. Elwood is one of the most extensive bee-keepers of the world. His large experience, his thorough knowledge of the business, his scholarly attainments, and gentlemanly bearing, lend great weight to what he has so ably said. One such article as this is worth hundreds of articles of abuse directed at our name and honor at the instigation of a single competitor.

Here is another strong article from a bee-keeper of international reputation who feels deeply indignant over the unfair and unreasoning methods that have been taken. He prefers to use a *nom de plume*.—ED.]

NOTHING BUT NOISE.

THE NEW DRAWN FOUNDATION AND ITS ENEMIES.

Adulterators? Yes. Who are adulterators? Nearly all of the great multitude of bee-keepers of the world. Who says so? A late issue of one of the bee-papers. How do you make that out? By their own words; for every writer of that symposium is using, and has been using during the past, something which is just as much of an adulteration as the proposed drawn or deep-cell-wall foundation which they are now crying out against. If there is any difference between a comb foundation with heavy rudiments for cells, from a thirty-second of an inch to one-sixteenth of an inch high, and a comb foundation having those rudiments extended to three-sixteenths of an inch on each side, thus forming the same amount of wax into short thin cells, nearly as thin as the bees themselves make, then the writers of those articles in that bee paper have failed to show it. If the one is an adulteration, then the whole foundation business is an adulteration, and they are sitting in the same "saddle" with the Roots and Weed in this matter, as the words of their own mouth prove—they not giving any practical argument to the contrary. Come, gentlemen, be consistent, and give us some proof in this adulteration matter, or else throw the whole foundation business overboard as a sinful thing. You say you use only enough foundation to secure combs built straight in the sections, and to start the bees in the same as quickly as possible. Is not the new deep-cell-wall foundation for the same purpose? and will it not answer that purpose better? Why have you not been shouting to your customers in the past, "Second-hand chewing of wax," "shipped with tallow," "stinking hides," "old lard," and "in-contact-with-all-nastiness" wax, before, when you have been pushing the same thing on the public, for lo! these many years? You must have forgotten that all commercial wax goes through a cleansing process with water, etc., by the Dadants, the Roots, and others, and yourselves probably, that takes

out all impurities and filth (if there is any) before it is made into foundation, "deep-cell-wall or otherwise.

I believe Doolittle told the truth in that bee-paper, when he said that this deep-cell-wall foundation was much nearer perfection for what it was intended than was the foundation which was accepted "with the tossing of hats" by all, with its advent; and there is not a thing, nor has there been any thing uttered by the opposition to shake the truth of his assertion. Many have thought that comb foundation was something sent from God (as are all good things which are appropriated by men), and if so (and who has doubts in the matter?) then this deep-cell-wall foundation stands in the same category, so far as any proof to the contrary has been given. Would it not be well for the opposers to turn and read Acts 5:34-39, inclusive, till they can give us something besides prejudice to sustain their position?

While much more fair than many of the others, I am surprised at some of the things written by Bro. Hutchinson. The desire to prejudice against the deep-cell-wall foundation is quite apparent in one of his articles. In this he is only doing what he considered very unfair in the sugar-honey controversy. Some sensitive people, while eating honey at my house, have piled up bits of wax about their plate, when eating honey, before the advent of foundation, equal to any thing that I have ever seen since, when the same persons were eating comb honey from sections which were filled with foundation; while the one who found no wax in his comb honey before foundation came, finds no wax now. There has been such a desire to prejudice against this deep-cell-wall foundation that matters have been only partly stated, all evidently having been given with a desire to create an opposition to it, and not in its favor.

Go on, friends Root and Weed; for in this abuse and desire to prejudice, instead of argument, you have no reason for complaint. If those opposed choose to fire in the air, why should you complain? Keep right on with your work. Waste no time in answering statements that are not arguments. Do not spend time and effort in trying to defend yourselves from these personal attacks. The utmost you need to do is to remind the opposition (unless something is presented different from what there has been) that your personal character or ability is *not* the "question before the house," and that your opponents, in attacking you personally, concede that they have no argument to produce.

From what I have read so far, as put forth by the opposition, I am constrained to give President Lincoln's little story, in closing: In conversing with a friend about the way his

administration was criticised and attacked, he said: "After all, it reminds me of a couple of immigrants fresh from the Emerald Isle. They were making their way westward in search of work, when, one evening, coming suddenly upon a pond of water, they were greeted with a frog chorus—a music they had never heard before. Overcome with terror they clutched their sticks and crept forward. The enemy could not be seen. At last a happy idea seized the foremost. Stepping to his companion's side he exclaimed, "And sure, Jamie, it is my opinion it is nothing but noise!" JUSTICE.

[Both of these articles came unsolicited; for we have not thought it necessary to scour the whole bee-keeping world writing letters (as the opposition has) to secure sympathizers. With the exception of the party mentioned we have not received one word of protest to the drawn foundation (and we have sent out now hundreds of samples) from our subscribers and patrons. On the contrary we have received scores of letters of encouragement and praise at the success of the new foundation.—Ed.]



STARTING IN BEE-KEEPING.

Question.—Having been persuaded by a friend to take GLEANINGS IN BEE CULTURE, through the reading of the same I have a desire to start in bee-keeping. Seeing that you have a beginners' department in that paper I am led to ask you how many colonies I had better purchase to start with. I had thought of buying 50 colonies. Do you think that number would be as many as I should buy?

Answer.—My answer would be, that said number would be from twelve to twenty-five times as many as any beginner should buy unless he has considerable knowledge of the business before thus starting into it. The beginner should guard against going recklessly into bee-keeping by putting his last dollar into a business he knows nothing of. It is this getting crazy over a business which looks to be a good thing, but with which we are not acquainted, and investing all we have in it, expecting to make a fortune, which ruins so many. To be successful in any thing, a man must "grow up" in it by years of toil and study till he becomes master of the business, when, in nineteen cases out of twenty, he will succeed. I was brought up a farmer, and educated by my father as such, so that, were I to change my occupation at any time, it would be to that of farming, unless I could have time to study up some business more to my liking before I left bee-keeping. Pardon a little personal reminiscence, given by the help of old diaries.

In the winter of 1868-'9 I became interested in

bees by reading the first edition of "King's Bee-keeper's Text-book," which chanced to fall into my hands. Next I subscribed for one of the bee-papers, read Quinby's and Langstroth's books, and in March bought two colonies of bees and the hives which I thought I should need for two years, paying \$30.00 for the whole. The year 1869 being the poorest one I have ever known, I had but one swarm from the two colonies bought, and had to feed \$5.00 worth of sugar to get the bees through the winter. In 1870 I received enough from the bees to buy all the fixtures I wished for 1871, and a little to help on my other expenses from the farm. So I kept on making the bees pay their way, as I had resolved, during the fall of 1869, that, after paying the \$35, I would lay out no more money on the bees than they brought in, believing that, if I could not make the three colonies pay which I then had, I could not three hundred.

In the fall of 1872 I found that I had an average yield of 80 pounds of comb honey from each colony which I had in the spring, which was sold so as to give me \$559 free of all expense incurred by the bees, except what time I found it necessary to devote to them.

That season I procured an extractor, and being determined to give the bees the care they needed, and knowing that the time the bees needed the most attention would come in haying and harvest time, I hired a man to take my place in the hayfield. It so happened that he commenced work on the day basswood commenced to bloom. Previously I had hived a single swarm in a hive filled with empty combs, and concluded to devote them to extracted honey. The man worked sixteen days at \$1.75 per day; and I extracted, during those sixteen days, honey enough from this colony to sell for a few cents more than enough to pay the man for his work. I state this to show that one new swarm of bees, properly worked, was equivalent to myself in the hayfield for sixteen days; yet how many, keeping from 30 to 50 colonies of bees, leave them, to go into the hay and harvest fields, and then tell us bee-keeping does not pay! You can hire a man to take your place in the field; but if you expect to become master of the bee-business, so as to make it pay, you can not hire a man to take your place in the apiary during the honey season; for, according to my opinion, it takes much more skill to be a successful honey-producer than it does to do the ordinary work on a farm. When the bees do not require any special attention, then they can be left, and the apiarist do other work, as he may have time; but the bees must not be neglected for a single day when that day will put them in condition to bring us dollars in the future, if we are to be successful bee-keepers.

In 1874 my honey was sold so as to bring me \$970, free of all expense from the bees, not

counting my time, and I now began to think of giving up the farm, but finally concluded to hold on to it one year more, to make sure that I could make bee-keeping pay as a specialty. After deducting the expenses of the bees from the sales, I found that I had the next year (1875) the amount of \$1431, and hesitated no longer, but gave up farming and embarked in the bee-business, with nothing else as a source of revenue, although since then I have had other "irons in the fire." Now, had I bought 50 to 100 colonies to start with, the expense in starting would have been not less than \$300 to \$400, which, in all probability, I should have lost in the business, for I should not have had a knowledge equal to the doing of so large a business on the start.

My advice to the questioner, and all others who think of trying bee-keeping as a business, would be, procure two or three colonies of bees; post yourself by reading and experimenting with them, as you can find time to do from the business you are already in, and thus find out for yourself which is the better for a livelihood—the business you are already in or keeping bees. If successful, after a series of years you can give up your other business if you wish to. On the contrary, if bees are a failure in your hands, then you will be but little out for having tried your hand at it.

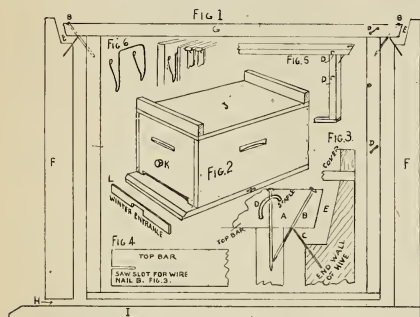


THE BOOMHOWER HIVE AND FRAME.

Mr. Root:—I want to give you a little idea of the style and construction of the hive I use. We have 300 colonies, and have used this style of hive for the last four years, and some of them longer. I have discarded all Hoffman frames. We used them two or three years, but found them too expensive and unhandy for rapid handling, crushing and killing too many bees. I have now passed my twentieth year in this business, making it my only occupation. I spent one year in A. E. Manum's apiary and queen business. I have in that time spent a small fortune in experimenting, but have at last a perfect hive at a little cost, and simple to make. I will boldly make this assertion: That I with this hive can do the work, and take up less than half the time required in any other style of hive. If you want to see something nice and handy, I will send you a complete hive by freight. I know you will laugh at the ease it can be handled with. You can't possibly crush a bee in handling the frames. A blind man with one hand can run bees in it.

You will see there is a complete bee-space all around the frames, and no possible chance

for the bees to glue them fast at any point. The frames are always free to handle: and, when the follower is in, not a frame can leave its correct position in the hive. I want nothing heavier than $\frac{3}{8}$ inch thick for top-bars. The staples are no hindrance in using the uncapping-knife, as I know we can and have extract-



ed 1800 lbs. of honey from the hive in less than three hours, with two of us, one to take them from the bees and one to run the extractor.

F. BOOMHOWER.

Gallupville, N. Y., Jan. 25.

[This is the hive and frame I promised (page 128) to show, although, as I have already pointed out, some of the principles are over 20 years old. The new *end-spaced Hoffman*, I think, would generally be preferred to frame as above shown; still, others may think differently.—Ed.]

NATURAL COMBS IN WIRED FRAMES.

In perusing your March 1st issue I was somewhat surprised to find a great discovery had just been made and commented upon as something new in bee-keeping, and the great possibilities for bee-keepers to produce natural combs by having them built directly in wired frames, straight and true, without the aid of foundation. I must say that I could not refrain from a broad smile at our friend, the discoverer of this new (?) process.

To me this process of getting fine straight combs built in wired frames is quite old, as I have been practicing it successfully for more than ten years, and have had many hundred if not thousands of true and straight combs built in my apiaries.

Two or three conditions are requisite for the best results, and must be strictly observed in getting these combs built true in wired frames, and true on the wires. The frames should have a V starter or its equivalent, and the hive must stand level from side to side, and be elevated one or more inches higher at the back than front.

If brood-combs are desired, a foundation starter can be used about one inch wide, to induce the bees to build more worker comb; and if drone combs are wanted, place your wired frames with or without foundation starters, in

or near the center of a populous colony that is gathering, and well stocked with honey and brood; or wired frames placed above the brood in the second story of the hive will generally be filled with drone or store combs for extracting.

Yes, the progressive bee-keeper can get fine natural combs, built without the aid of foundation, by observing the above suggestions, and compete with the closest competition, if the present methods of adulteration are not taken into account.

J. W. WINDER.

New Orleans, La.

CAGES FOR SENDING QUEENS LONG DISTANCES.

I am much pleased to inform you that the last two queens you sent me arrived in good order. I am glad that you have adopted my suggestion and made the cage deeper, and also ventilated one end only, and left the other snug and warm. The cage as now made is nearer perfection than ever. There are no small passages, as in the Manum, for the dead bees to close up, and the bees can now adapt themselves to the temperature through which they may be passing, by moving from one end to the other. I have now been corresponding with you for several years in regard to the construction of these cages; and while you have maintained all along that the food had much more to do with the successful conveyance of the queens than the cage, I have insisted that the construction of the cage is equally important, and I think so yet. I am not yet convinced that honey as a part of their rations conduces any thing to success, and I'll tell you why: By the mail before last I received 8 queens from you, of which 4 were dead; and in one of the cages with the live queen the honey had not been touched. The candy, if properly made, will never run and daub the bees, and it contains *all* the essentials necessary to sustain the bee to the end of its natural life, and honey can't do more. When the time arrives I intend to send you 4 queens by the same mail, put up in cages similar to your latest, but in two of them I will fill the "honey" compartment with candy, and you can carefully note the condition of those cages containing a part ration of honey and those with none.

In regard to those two queens that I received last, in one cage the queen was the only inmate alive, but she was so lively that she was amusing herself by flying around the cage. The other cage, however, made my heart jump, for it contained 33 *clean, lively* workers, and only 17 dead ones. By the same boat I received two queens from Jennie Atchley, put up in a partitioned box similar to those sent out from Italy, with one small frame of honey only for food, and about 100 escort bees. In one compartment the queen and all the bees, with the exception of a solitary worker, were dead, while the other compartment contained two live workers and the queen.

So far this season I have received 14 queens from you, of which 6 have come alive. From other dealers I have received 11, out of which number only one has come alive. How does this speak for the superiority of your style of cage? You are on the right track, and practical perfection is not far off. H. L. JONES.

Goodna, Queensland, Aus., Nov. 20.

[I can't agree with you in thinking that the honey does not conduce to success. In two other shipments sent about the same time as yours, *all* the honey was used, and but a part of the candy. If you tear up the capping I think you will find that the honey was used. We found, owing to the lack of room and the coating of paraffine, that the bees tunnel under the capping. At first sight the honey appears untouched.—ED.]

LUCERNE OR ALFALFA HONEY INJUSTLY ASSAILED; QUALITIES OF OTHER HONEYS.

Some months ago there appeared in your columns a letter from Mr. E. Lipper, editor of the *Aust. B. Bulletin*, in which he referred in most disparaging terms to the quality of lucerne honey. Surely you, Mr. Editor, and the many bee-keepers of your land who have given such high opinions of the quality of alfalfa honey, can not have recognized that it was your old friend who was thus, though under another name, being abused. Neither a footnote, nor any article that I have noticed since in your paper, makes any defense of alfalfa honey.

At a recent meeting of the Hunter River Bee-keepers' Asso., Mr. Munday, the pioneer of modern bee-keeping in this district, drew attention to this particular portion of Mr. Lipper's letter, and elicited the fact that the experience of every bee-keeper present directly differed from that given by Mr. Lipper. A few years ago, when, after the great flood of 1893, there was none but young lucerne-fields, the yield was light, and the quality nearer like that described by Mr. Lipper; but now that the plants have become strong and deep-rooted, the yield is good, and the quality in color, density, flavor, and aroma, such as to suit the most fastidious taste, pleasing eye, palate, and nose.

At the last Maitland show it was an exhibit of lucerne honey that carried off first honors, and the same was the case at Singleton.

Surely Mr. Lipper has made a mistake in slandering the quality of this honey, gathered from the only source yielding much honey, near the town where he resided for many years.

Trusting you will find room for the insertion of this letter, written by instruction of the H. R. B. K. A., as an expression of the unanimous opinion of those present at that meeting, I remain, etc.,

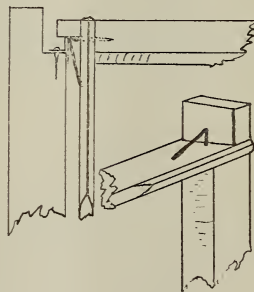
MICHAEL SCOBIE, Hon. Sec. H. R. B. K. A.
West Maitland, New South Wales.

[The matter to which you refer appeared on page 570 of last year. I have again read over the paragraph, and I do not see that the char-

acter of alfalfa is assailed, for I could hardly allow that without a protest. Mr. Lipper simply says the honey is very thin—almost sweetened water—and that he has not been able to get it thicker. I simply supposed that the climate had something to do with it, for the same honey in this country is beautifully thick, and of the very finest quality. You probably have not seen what has appeared in our columns in favor of alfalfa. A couple of years ago it was extolled by quite a number (among them the writer) as the richest and finest honey in the world, and to this day I have not tasted the equal of it, although the ordinary northern clover approaches it very closely. Next, according to my notion, would come sweet clover, basswood, mountain sage, and thistle. Among southern honeys, palmetto, mangrove, and Texas horsemint stand high.—ED.]

END-SPACING OF FRAMES.

Your sketches of end-spacing devices are timely. End-spacing, to a large degree, does away with one of the principal objections to Hoffman frames. I have found that propolizing ends of frames makes them harder to move than the little they may stick on end-bars. I am afraid, though, that the staples will cause some annoyance to bee-keepers who, being unaccustomed to them, and being used to full-length top bars, will, in replacing frames, get the end in line with hive, and bring down the frame with a jar on the tin rabbet. Why not bend wires like enclosed cut? You see the



lower end is left rough to go a natural distance into the end-bar, using the templet as guide to driving, as suggested in GLEANINGS.

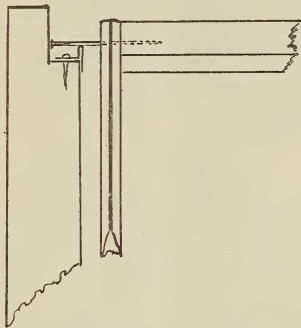
B. F. ONDERDONK.

Mountain View, N. J.

[This same idea was submitted to us, I think by F. Boomhower, of Gallupville, N. Y.; and our Mr. Calvert, before his samples came to hand, had bent some wire nails and attached them to the frames. But the more we considered it, the more we became convinced that the staple, which we have since adopted, is the better. An objection to the bent nails above shown is the difficulty of driving them into position. I can not explain it; but one will discover it when he comes to drive very many of them. Moreover, the lower projection can do very little more than prick into the wood; and this end would not be as stable for that reason as it ought to be. But the most serious objection is, the moment the frame is raised a little there is too much end play. We tried frames stapled and frames as above, and we very soon discovered that the stapled

frames would hold their position much better. For instance, in hauling over rough roads, the bent-nail spaced frame is liable to hop out of position, and then the wide ends of the Hoffman frames interlock. The stapled frames can be jarred up a quarter of an inch from the rabbet, and still be end-spaced correctly. Here is another idea:]

In reading over your description of the Hoffman frame for 1897, the idea struck me, "Why



not do away with the wooden ends altogether, and replace them by nails thus?"

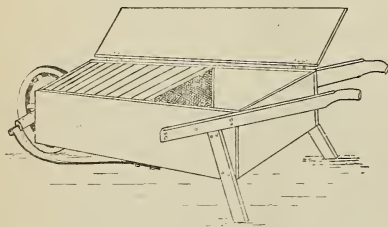
Knoxville, Tenn.

ADRIAN GETAZ.

[At first thought this seems like a very simple solution of the problem; but here actual experience is very much at variance with theory—at least it was so in our experience and in that of some others who have reported in regard to it. The worst trouble is, that the nail, even if it does not bend itself, as it does, has too small a bearing in the wood; and a 15 or 20 lb. frame in time causes the top-bars to be of uneven height.—Ed.]

A WHEELBARROW FOR CARRYING EXTRACTING-FRAMES.

Inclosed find a drawing of the wheelbarrow I am going to use the coming season in the apiary. It is all made of pine lumber, and is very light, using $1\frac{1}{2}$ -inch band-saw for tire, and $1\frac{1}{4}$ -inch spring-steel for the springs, which are 30 inches long, and fasten on to the bottom of the box with two $\frac{1}{4}$ -inch bolts in each spring, as shown. The wheel is 17 inches in diameter,



with $1\frac{1}{2}$ -in. rim and 14-in. hub. The box is 44 in. long, $12\frac{1}{2}$ in. deep, and 18 in. wide, outside measure; handles 32 in. long, projecting 16 inches, and screwed on the sides of the box; legs 11 inches, projecting below the box, making the box stand level when not in use. The box can be made to suit the length of frame

used. I hang my frames in crosswise, because I have them all wired. If one wants, there can be a rabbeted piece put in crosswise, and they can be hung in lengthwise. If not wired, that would be better. I can carry 27 frames in this box; and as I use 9 frames in my hive I can take the combs from 3 uppers at a time. It seems to me that this would suit bee-keepers much better than the ordinary wheelbarrow; and it cost me only \$1.75, and I did the work, and have it all painted and ready for use.

Last year we had no honey to speak of in Southern California, but hope to get a good crop this season, as we have had an abundance of rain—about 16 in. in all—and every thing is looking very promising, and my bees are in fine condition. We are expecting to get a good flow of orange honey, if the weather is favorable the latter part of this month, before moving our bees to the hills.

M. H. DUNN.

Fullerton, Cal., March 8.

[Your wheelbarrow idea will do very nicely. The only objection is that it places a pretty heavy load on the man. Some years ago we illustrated a comb-carrying cart used by Mr. Osburn, then of Cuba, constructed somewhat on the same plan, only that it had two cart-wheels, and an axle-tree, a little forward of the center of the cart. This would place almost the entire load on the wheels, and of course be much easier for the man. But your wheelbarrow would have the advantage that it can be run in a narrow path, and would be a little more easy on the load if not on the man.—Ed.]

THE ARTESIAN WELLS OF SOUTH DAKOTA.

I think A. I. might have been satisfied with seeing artesian wells that threw out water 100 to 150 ft. high at the rate of 600 to 1000 gallons per minute; also one at Aberdeen, that has not been properly cased, that is washing out the town so that several houses have had to be moved to save them from being undermined.

A FISH-STORY; CATCHING \$1000 WORTH OF FISH A DAY FOR 16 CONSECUTIVE DAYS.

At The Dalles, Oregon, are immense salmon-canneries where they catch fish in large wheels costing \$500 each. These are turned by the water, and elevate the salmon above water, into a large box. I was told that one man owning 10 wheels that cost \$5000 had caught and sold \$16,000 worth to the cannery in 16 days.*

At that place was my first sight of an immense lumber and wood flume, 20 miles long, that brought large quantities of wood and lumber from the mountains. On our way to Vancouver by steamer are many fine scenes. At one place is a waterfall of 850 feet.

HARNESSING UP NATURE.

At Boise City, Idaho, they are "harnessing up nature," as Uncle Amos advises, by warming the business houses and depot with hot water out of deep wells. It seems the deeper the well, the hotter the water.

Well, I expected rain in Oregon, and we got

it; but when I got to California I expected honey but failed. I stopped in hotels in Marysville, Sacramento, Oakland, San Francisco, San José, Santa Margarita, Los Olivos, and San Luis Obispo, on stage route, and Los Angeles and Santa Monica and at several private houses, and at no place was honey on the table. I saw several apiaries on the stage route over the mountains between Los Olivos and Santa Barbara. I think it is time the bee-men created a home market for their honey.

If you ever wheel this way, call on me. I am not far from Mr. Cole, the garden-plow man. Mr. Porter, the bee-escape man, lives at Lewistown.

M. W. MURPHEY.

Cuba, Ill., Dec. 8.

RETAILERS MUSSING UP HONEY.

Woodchopper's complaint in April 1 GLEANINGS, concerning retailers mussing honey in handling, etc., and frequent complaints of others in the same strain, caused me to think that perhaps my way of getting around that unpleasantness might be generally appreciated by honey-men, as I already know it is appreciated by a number of grocers I supply with honey.

It is merely a small cupboard, about 20 inches square, if you use the $4\frac{1}{4}$ square, and 22 inches high, made of fancy pine, oiled and polished, with a 14x16-inch glass in front, thus showing the faces of 16 sections. I make it with a shelf in the middle; place a paper on the bottom and shelf, and set the sections on narrow strips $\frac{1}{2}$ inch thick, which prevents all mussing from leakage from any cause. I extend the paper on the shelf down just below the top of the first row of sections underneath, so that nothing but honey meets the eye of the purchaser, and they—well, they just look, admire, and buy, but never handle and muss, as the door opens behind the counter.

Two grocers told me that it more than doubled their sales the first year, and my order-books prove it. It makes honey as clean to handle as canned goods, which is a great consideration with dealers.

W. W. CASE.

Baptisttown, Pa.

"NON-SWARMERS" SWARMING.

To-day at 11 o'clock I experienced the novelty of uniting two swarms of different races of bees. Swarm No. 1 was headed by a Carniolan queen from Miss Amanda Atchley, of Beeville, Texas. It settled on a limb nearly opposite a hive of H. Alley's celebrated non-swarming Adel bees. This latter hive showed a disposition to swarm some two weeks ago, when I took the precaution to clip the non-swarmers' wing, and added another story, making a three-story hive. Just as I finished sawing the limb, and was lowering it to a new hive at the foot of the tree, the non-swarming

Adels issued; but their queen failed to follow, and they began settling down with the Carniolans, seeing which I promptly added another story with full sheets of foundation, and in less than ten minutes every bee was inside.

I moved the hive to a new location; and upon examination this evening I find the beautiful grays and the golden Adels (making an elegant variegation) busily engaged in fitting up their new home. Both stories showed them intermixed, and every indication of being thoroughly united. Will they stick?

Franklin, Tex.

JNO. C. MITCHELL.

[The fact that the two swarms united is nothing unusual; but the fact that the "non-swarmers" did come out is rather of a joke on friend Alley. However, there are exceptions to all rules, and in the case of bees there are a good many, especially when it relates to swarming.—ED.]

THE ADVANTAGE OF DEEP ENTRANCES IN GETTING ALL THE SECTIONS FILLED.

In response to your request as to whether the raising of the brood-chamber from the bottom-board causes a more even distribution of the surplus in the sections above, I will say that I think it does. I use a $\frac{3}{4}$ -inch frame between brood-chamber and bottom-strips on bottom-board, making an inch clear of bottom-board for wintering. The dead bees then drop down out of the way, and do not mold the combs. Last spring I left 10 hives with these deep entrances, as they were large colonies, but I never thought it was the cause of every section in the super being well filled, as the case proved to be. Flow was only moderate.

J. C. WALLENMEYER.

Evansville, Ind., Jan. 27.

DRAWN FOUNDATION AND ITS ENEMIES.

It is really amusing to see so many alarmists brought in line by a little editorial fire, to fight an imaginary foe in the shape of drawn foundation. With "Progression" inscribed on their banner they would deal the death-blow to deep cell walls, the acme of genius and skill, condemned and untried. But all opinions found prior to a fair test of the comb is no proof of its failure. Bring it to the front, regardless of the unkind thrusts at your reputation; for it is said, "Woe unto him of whom all men speak well."

A. B. BAIRD.

Belle Vernon, Pa.

BLACKS BETTER FOR WINTERING THAN ITALIANS.

My black or common bees have come out uncommonly strong in numbers; but half my Italians have died in the hives with plenty of honey. I set my hives in outside cases large enough so that I packed three inches of leaves around the hives and on top. Still the bees are dead. I like black bees best.

Hinsdale, Mass.

C. G. ASCHA.



SPECIAL attention is called to the articles by P. H. Elwood and Justice, elsewhere in this issue.

THE flood of orders for supplies from all quarters seems to indicate that the prospects for the season are unusually good.

FOR several issues back we have been giving eight extra pages to make room for the extra advertising, and it looks as if we would have to continue giving this extra space for a while.

THE copy for the Fred Anderson serial came to hand just too late to get in this issue; we regret, therefore, that we have to leave it out this time. Copy is in hand for the rest of the story, and there will be no skip from this time on. It is drawing to a close, and the "mystery of Crystal Mountain" will soon be made clear.

THERE is some talk of a change of name for the United States Bee-keepers' Union, to something else, to avoid confusion with the other organization, the National Bee-keepers' Union. If there are to be two Unions, then a change should be made. Personally I like the name United States Bee-keepers' Association. At the next annual meeting in Buffalo this thing will be discussed.

WE put into winter quarters last fall 241 colonies, most of them in fair condition; but there were a few weak ones. We find at this date, April 24, 230 colonies; 5 of the 11 seem to have died during winter from the extreme cold, the other 6 having spring-dwindled during the last two or three weeks. Some of the weather of late has been unfavorable. There have been a good many raw days, some of the nights going down to freezing and below. The consequence is, we have had a little touch of spring dwindling.

"SUCCESSFUL BEE-KEEPING" is the title of a booklet on bees, by W. Z. Hutchinson, published by the W. T. Falconer Mfg. Co., Jamestown, N. Y. It takes up the subject of learning the business, selecting the locality, the kind of bees to get, transferring bees, introducing queens, producing comb honey, etc. Several years ago we realized the necessity of getting out a booklet on the management of bees, because we noticed that there were many who, even if they could afford to buy the more complete text-books, would not take the time to read them, and we therefore put this matter, not in a booklet, but in extra pages of our catalog. It is not possible to estimate the amount

of letter-writing that this has saved. Mr. A. will write in and ask how to transfer bees. To refer him to the text-books at the price of \$1.00 or \$1.25 is apt to have a wrong effect; but giving him the information needed, boiled down in a nutshell, at no cost to him, very often gives him an appetite for more knowledge, and this means an order for a text-book. The fact that W. Z. Hutchinson's name appears as author of the booklet mentioned is a guarantee that the instruction is boiled down and orthodox. We do not know whether any price is charged or not. Inquiry can be made of the publishers, as above.

HOW TO MAKE END-SPACING FRAMES OUT OF OLD-STYLE HOFFMAN FRAMES.

NEXT week we shall cut off the top-bars and put on the end-spacing staples to all the frames in use in our apiary. The projections of the top-bar are $\frac{3}{4}$ inch, and we shall therefore have to cut off about $\frac{1}{4}$ of an inch from each end. To do this most expeditiously we have constructed a tray without bottom, 4 inches deep. The length of this tray, *inside* dimension, is $\frac{1}{16}$ inch longer than the outside dimensions of the Langstroth-Hoffman frame. The width should be the same as that of the hive used, and in our case that of an eight-frame hive. This frame is mounted on legs of $\frac{1}{8}$ -inch stuff, 2 feet long, the legs being braced. We now have a topless table two feet high. The length of the projection of the top-bar to end-spacing Hoffman frames is $\frac{1}{2}$ inch; therefore the thickness of the ends of the tray should be a scant $\frac{1}{2}$ inch.

WE are now ready to cut off the top-bars of all the old-style Hoffman frames in the apiary. We set the topless table near the hive; shake the bees off the frames in front of the entrance, and slip them one by one into the tray or topless table. If the table has been made right, the frames will just slip between the ends of the tray, and the top-bar projections will stick over $\frac{1}{4}$ inch. A saw now cuts them off just even with the end of the tray at both ends. After the staples are put on according to the directions previously given on page 95, the frames are ready to be put back into the hive. The other hives are then treated in a like manner. Usually it will be found advantageous to have an assistant, because two can work to better advantage.

MORE EXPERIMENTS WITH DRAWN FOUNDATION; HOW BEES MAKE COMB.

ACCORDING as the weather has permitted during this spring, we have been putting into the hives at different times samples of the drawn foundation, together with a sample of ordinary foundation in the same comb, side by side. As it was cool weather, and no honey was coming in, the foundation of course in every case was either untouched or gnawed into, while the

drawn (or deep cell) article was as often accepted. A very noticeable fact is that, when the new product is put into the hive, it is transparent. After the bees have had it for 24 hours the new transparent cell walls seem to assume the color of natural comb or appearance of ground glass. The bees began immediately, it seems, to thin down the walls to their natural thickness, and in doing so they seem to take off thin scales of wax, and add them on to the ring of wax at the top of the cells. While the new product is accepted at once, it seems to be all worked over with the exception of the base, which is flat, and apparently untouched, so far as thickness is concerned.

From experiments Mr. Weed has conducted, it would appear, although we may be mistaken, that the bees do not generally, at least, straddle the cells of common foundation with their mandibles, and continue this process of pinching until the cell is elongated, but, on the contrary, take off little minute films of wax at the point where it is not needed, and add it to the thickened ring at the top of the cell. It would appear that, in natural-comb building, the comb itself is made up of small particles pressed and kneaded together into a perfect comb; so, then, when we give them the new drawn foundation they reduce the thickness of the wall by taking off small particles and adding them to the top of the cells. This process of scooping off the minute film, and adding it to another point, gives the cell walls a sort of scraped or scooped ground-glass appearance to the naked eye, taking away that delicate transparency that is so noticeably characteristic of the new Weed drawn foundation. If the bees build their comb in this way, as we have reason to believe they do, then we can account for the flaky condition that Mr. Hutchinson describes; and it is possible that by "flaky" he meant—well, easily crushable comb, not brittle, as the term would seem to indicate. If this is a desirable characteristic it will be just as marked in the new drawn foundation as in the ordinary product.

In the experiments Mr. Weed has been conducting, it seems to be apparent that bees take the new drawn foundation quicker when the cell walls are somewhat defective or broken than when they are perfect, because they seem to regard the broken article as their own product that has been damaged, and must, of course, be repaired at once.

We are now sending out hundreds of samples of the new product; and I hope others will experiment. If the new thing can not stand the examination of impartial critics then it is not fit to stand. I say "impartial," because I am fully aware of the fact that there are those who show by their very writings that they have no disposition to give the new article a fair test. Fair criticism we are prepared to meet, but don't care to waste time on anything else.

APIS DORSATA; A SCHEME TO GET THESE BEES IMPORTED INTO AMERICA AT A SLIGHT COST.

We have just had a very pleasant visit from Mr. W. E. Rambo, at present located at Hiram, O., but who has been until recently a missionary at Damoh, India. He is now recuperating in this country, but expects to go back to his mission field this fall to take charge of a boys' orphanage and industrial school. While here he is posting himself up on various industries, with the view of introducing them into his new work among the boys. He has been a subscriber to *GLEANINGS* for a year or so, and in the mean time has been reading and studying so that he may be competent to teach bee-keeping.

When I learned that he was a missionary from India, a subscriber to *GLEANINGS*, and an enthusiastic bee-keeper, the suggestion of Mr. W. A. Stillson, of the *Nebraska Bee-keeper*, flashed through my mind. You will remember how he showed up the folly of sending a man over to India, at an enormous expense on the part of the general government, to secure *Apis dorsata*. He urged that, if these bees were really desirable, and could be domesticated, they should be obtained through missionaries already in the field, at a very slight cost.

After talking with Mr. Rambo in regard to the famine in India, the general climate, the characteristics of the people, of tigers (especially the man-eating kind), we began to discuss the feasibility of importing *Apis dorsata* and *Apis Indica* from that country to this. He described to me a small bee that seemed to be very common in his vicinity, and which I feel very sure is *Apis Indica*. They build a single comb under the limb of a tree, and their nests are very common. He has also seen what he believes to have been the *Apis dorsata*, and the nests themselves.

The upshot of the whole matter was that we are to equip him with hives, material, etc., necessary to test *Apis dorsata* right in its own climate—in other words, determine whether they can be domesticated *at home*. He was, however, of the opinion that neither race I have mentioned could be confined to a hive; but if they could he was sure that he and his native helpers, who are quite familiar with the bees, could do so just as well as and far more cheaply than Uncle Sam by sending a man over.

When Mr. Rambo leaves this country in September we expect, of course, to send along with the general shipment some mailing-cages as well as some small boxes for express shipment. Arrangements can be made to have the bees shipped to some bee-keeper in England, where they can have a cleansing flight, and, after a few days, be forwarded to the United States.

There, now, don't you see we can get *dorsata*, if it can be kept in hives at home, at an infinitesimal cost.

tesimal part of the cost that it takes to send some one after them?

If they can not be domesticated in India they certainly could not be in this country; so we would determine this point first before we went to further expense. But even if they could not be domesticated they might be of advantage in the way of the fertilization of certain flora by letting them run wild in California and the South.

Now, I suggest that bee-keepers, instead of trying to encourage a scheme that would cost the general government thousands of dollars, wait to see what the A. I. Root Co. can do through Mr. Rambo. This would cost the general bee-keeping world practically nothing.

We expect to have another interview with Mr. Rambo before he leaves for his mission field, and all details will be further discussed.

QUEENS EXCLUDED FROM THE MAILS.

A GENTLEMAN conversant with mail matters informed E. T. Abbott, ex-president of the N. A. B. K. A., that the government was "talking of excluding queens from the mails." This would indeed be a calamity to the bee-keepers of the United States. The sending of queens by mail has grown to be a large and important industry. Anywhere from five to ten thousand dollars' worth of queens are sold in a single season in this county alone. Great good results in the interchange of stock, and without this interchange there would very soon be in-breeding.

Our older readers will remember that there was a time when queens were debarred from the mails, simply because one ignoramus of a bee-keeper attempted to send a queen and some bees in a flimsy *paper box*. Of course, the box broke and let the angry bees out into one of the important offices of the service. The result was that Uncle Sam shut down on sending any more queens through the mails, and we all had to send queens by express at a charge of from 15 cts. to \$1.00. These charges, for the time being, killed the industry. I wonder if another ignoramus has tried sending bees or queens in another paper box, or doing something else equally foolish. It would be interesting to know why the government should be talking at this time about "excluding queens from the mails." Bee-keepers have enjoyed the privilege for the last 15 years, and we were not aware that there had been any trouble since the paper-box incident.

It was Prof. A. J. Cook who made a special trip to Washington to get the queens readmitted to the mails, and he was successful: but the condition was made that there should be two sheets of wire cloth over the opening to the cage. But in later years bee-keepers have, instead of two sheets, used one, and a thin strip of board over the wire. This con-

forms to the *spirit* of the law—in fact, is better than the two pieces of wire cloth.

WORK FOR THE NEW UNION.

The United States Bee-keepers' Union, recently organized, has been advised of this matter; and as a member of the Advisory Board I feel sure it will take energetic and prompt action. But in order to accomplish much in this or any other direction there must be more means and more funds at the disposal of the General Manager, Mr. Secor. Under the circumstances, the new organization has made a good start; but it needs something more than a good beginning to do the work that it has laid out for itself. Bee keepers everywhere who are interested in seeing that queens are not shut out from the mails, in fighting dishonest commission men, in coping with the adulteration evil—in fact, in any and every thing that needs intelligent and organized effort, should send in their names, accompanied by \$1.00, at once to the General Manager, Eugene Secor, Forest City, Ia., or to the Secretary, Dr. A. B. Mason, Station B, Toledo, O. If more convenient, the money may be sent to Mr. G. W. York, 118 Michigan St., Chicago, or to this office, and we will see that the money is duly forwarded, and the persons enrolled as members. Remember, the amount is \$1.00. This entitles you to all the privileges of the organization, and allows you to have a voice in certain matters at the annual meeting, whether present or not.

HOW HISTORY REPEATS ITSELF.

THE little opposition that has been stirred up against the new drawn foundation is not so unlike the opposition that was urged against railroads in China, where, after using one a while, they tore the rails up, as the cars "disturbed" the repose of their ancestors. (The new drawn foundation seems to have disturbed the "repose" of a few bee-keepers). When railroads were first suggested in this country, so great a man as Daniel Webster "proved" in Congress that a railroad train could never go up grade, could not be stopped within twenty miles on a level, and never on a down grade; that it was not safe, and yet he lived to see them stopped in their own length at any point. The English bridgebuilder, who built the great Victoria bridge over the St. Lawrence River, declared that the proposed suspension bridge at Niagara would never hold its own weight up, that it was not safe, and "proved" it—by riding over it in a car while on his way to dedicate his own bridge further on. In these latter days a few have tried to make out that the new product is going to ruin the bee-keeping industry, and, according to their opinion, they have "proved" it too. As prophets they can look backward better than forward. But railroads and suspension bridges have come to stay, and so has the new drawn foundation.



I think I told you the population of Jerome was about 2000. Of this number about 600 are at work in the mines. Wages average about \$3.75 a day. Now figure this up for seven days in a week and you will see how much hard cash is paid to workmen in that one mine every week; and I suppose it is true that something like \$15,000 a week is what the company pays its men. But, hold on, friends. They not only work week days and Sundays, but they work day and night. There is no stopping at all of the ponderous machinery. If I am correct, there are extra engines and dynamos and other machines, so that one can be hitched on while the other is being overhauled and repaired. When the machines wear out they get new ones; and when the men wear out they get new ones. You may think the wages pretty high; but please remember that board, even by the week, is about a dollar a day; and if you rent a decent house to live in, your rent is a dollar a day, and other things in proportion. Wood is \$7.00 a cord. They do not draw it in wagons, as we do, but it is carried on the backs of patient and faithful burros. These burros need no graded road, such as a wagon must have. They toil patiently up and down a foot-path or trail sometimes almost too rough and narrow for one to go on foot. I was greatly interested in the burros. The man who furnishes wood comes into town with perhaps half a dozen. He talks to them as he would talk to a well-trained dog, and they are wonderfully obedient to his voice. Their load is so great that it is sometimes a difficult matter for them to keep their balance. A sort of rack made of wood and ropes holds the load of wood—not so much on their backs, but each side of their backs being about equally balanced. They seem nervously afraid of running against anybody or against each other; in fact, it makes me think of a rider on a wheel carrying a considerable burden. If you look at the feet of the burro and the size of his slender legs, it seems almost incredible that he can carry such loads; and, in fact, they often do jostle over and go rolling down the mountain. In that case it is no great financial loss if the burro is killed, for they cost only about five or ten dollars. When they come into town each seems very anxious to have his load removed. The driver is always careful to take the wood first from one side and then the other, so as not to throw the little animal out of balance. When he is relieved of his burden he seems very thankful; and while his master is unloading his comrades, he takes the opportunity of looking about to see what he can pick up in the way of provender. I asked one of the clerks at a grocery what burros fed on. He replied:

"Oh! any sort of rubbish they can pick up. In fact, they eat almost any thing. Some folks say the burros eat tin cans when they can not do any better. This I can not prove, but I do know they eat all sorts of waste paper; and when a burro can get hold of the outside casing of smoked hams then he has a picnic indeed. Why! they are regular scavengers. They pick up almost every thing that is thrown out of the front door or the back door, all over town."*

*Mrs. Jordan told me she saw a burro one day that must have got strayed away from his comrades. He came into town alone, and marched up to a

I had quite a curiosity to know more about the source of the waterworks that supplied the town. In the afternoon, when my good friend Mr. Jordan was obliged to resume his work, I secured the services of Master Harold Jordan. He is just about the age of Huber, and, like Huber, is greatly interested in any thing about electricity. I told him some things he wanted to know, and he told me a good deal that I wanted to know. Among other things, he said if I did not mind the walk he would go with me to the spring that feeds the flume that pours its contents into the great water-tank, 500 feet above the town. First we took a burro-path up over the mountains. On the way we passed under an apparatus that strongly attracted my attention. It is what they call a "bucket-line." It was put up ten years ago, before the railroad was built. This bucket-line is an arrangement of a stationary cable and a movable cable elevated on posts or poles, so as to run a bucket along the wire for a distance of nine miles. I should say, rather, a string of buckets, for the buckets are perhaps 100 feet apart. On one side they go to the town of Jerome loaded, and on the other side they go back empty. Of course, a steam-engine works the machinery. Harold told me it took the buckets from morning till night to make the trip; for one of the boys wrote something on a piece of paper and put it into a bucket in the morning, and it did not reach Jerome until night. This bucket-line brought in fuel, limestone from a distant quarry, and supplies of other kinds that might be needed. Of course, such an apparatus could run from cliff to cliff, over and through tree-tops, and across yawning chasms where even a burro could not make his way.

Now we went up hill and down hill in going to that spring; but when we found it, it was off in a little valley or canyon where a little stream came down between the hills. Said I:

"Why, Harold, this spring can not be higher up than that great tank away up above where you live?"

"Why, it looks so, Mr. Root; but if it were not higher, how in the world would the water run? and it does run all the way, and seems to be down hill too, for we boys have followed it away around the mountain. It is a good way farther than the way we came, but it is surely down hill all the way."

Here, again was another illustration of that queer feature of these mountainous regions.

The United Verde & Pacific Railroad comes into Jerome away up above the town. If you want to see the railroad station you have to look away up. This railway is proud of the distinction of being the crookedest road on the face of the earth—at least, folks say so. Instead of following watercourses through the valleys it runs a good deal of the way along the crests of the mountains; and of course it has to do a great deal of twisting and turning to keep any sort of level. I suppose one object in bringing it in at such an elevation above the highest point of the smeltingworks is that the freight may be all dropped down an incline to such a point in the mines as it may be most needed. In loading the cars with the copper and gold, these metal ingots are simply run up on a powerful elevator.

By the way, there can not anybody steal gold from this mine—not even the workmen. Every

woodpile and looked around in a pleading sort of way to have somebody unload him; and then he went to another woodpile, and so on all around the neighborhood. Nobody could unload him, because nobody had a right to do so, and so the poor fellow was in trouble indeed.

dollar's worth of gold is securely locked up in, say, a hundred dollars' worth of copper, and it would take an expert burglar, I tell you, to break the lock that holds the gold combined with the copper. So these great bricks are loaded on to freight-cars, and run clear across the United States, with as much safety as if they were blocks of paving-stones, and yet they may contain millions of gold. In fact, it has been estimated that the Jerome mine has produced as high as eight millions of dollars' worth of gold in a single year.

ELECTRICITY VERSUS MULE POWER IN MINING.

The Jerome mines are said to be the first in the world to pull out their ores by substituting an electric motor in place of the time-honored mule. With ordinary mining, a mule or other animal pulls a single car; but the electric motor will pull a train of a dozen cars or more, all laden with ore. It was my good fortune to stand at the mouth of one of the tunnels when the motor came out with its string of ore. Said motor is about the size and shape of a good-sized cooking-stove. Imagine a large sized cooking-stove mounted on wheels, with the engineer sitting on the stove-hearth, and you have it. He sits on the stove-hearth, or a low down seat, because his head would be hitting the roof of the mine were it otherwise. Then he does his switching and backing up and going ahead, etc., by simply "pressing" the proper "button." I was kindly invited to take a seat on the motor, and ride around the yard in the open air while he pushed certain cars here and there as the workmen wanted them for convenience in building up the piles of wood and ore for roasting, as I have described.

I was very anxious to accompany the motor away back under ground into the mountain; but my companion had told me that nobody was allowed to view the mineral wealth the company had discovered in their underground tunneling. Not even the bosses and proprietors of the mine were permitted to view the company's wealth unless they were specially employed in the mine, and the workmen were not communicative, for reasons best known to themselves.

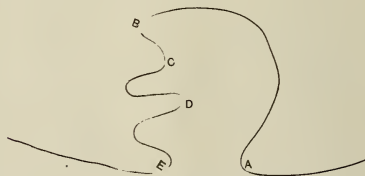
Now, lest some of you may think it worth your while to take a trip to the Jerome gold-mines to get a job, let me tell you there are men standing around all the while, waiting for a chance to work. Mr. Jordan told me of a man who walked over that crooked railway all the way from Prescott to Jerome, then waited for a chance to get a job, without any thing to eat until some time in the middle of the night, when a man was found lacking. Then he worked several hours without any sleep or food, so as to secure a place. The man who is not on hand to take his place when the whistle blows loses his place, and somebody else steps into his shoes. If he makes an arrangement to be absent, or gives some good reason why he can not be at his post, I presume he might hold his job; but the man who is away, with no explanation, is out. I wonder what the friends in our establishment would say if we should substitute a similar rule.

A competent physician is employed by the year, and a small per cent of each man's wages is held back as a fund to pay the doctor's bill; so that the man who is sick does not have to stand the expense of medical care. I am not sure but this fund, or a similar one, supports the man's family while he is sick, or in case of accident and loss of life. Each man as he is employed is obliged to submit to this small assessment as required.

I was obliged to take my departure from Je-

rome before daylight. This I greatly regretted, because I missed a view of the grand scenery. There was just a glimpse of dawn as we started; and after we were out four or five miles I could see tolerably. The San Francisco Mountains loomed up in glorious majesty at almost every point around Jerome. In fact, we had them constantly in view when we were making that trip between Camp Verde and Jerome. The two peaks are just a little north of Flagstaff, right on the road to that wonderful Grand Canyon. I do not remember now their height; but it is great enough so they are constantly white with snow. A little further west, and the celebrated peak "Bill Williams" looms proudly up in the distance.

Before leaving the locality I want to give you a little bit of illustration in regard to that crooked railroad. In railroading all over the United States we often see a "horseshoe" feature as it is called. In order to avoid the expense of a bridge across a valley, railroad men often run around, as it were, so that the track, after making quite a horseshoe loop, comes around near to the place of starting. Now, the Jerome railroad not only makes some wonderful horseshoes, but it has a horseshoe within a horseshoe. In the figure below I have not tried to draw a man's face.



First we have the large curve; then, in order to get in and out around the mountain, we have the short curves back and forth, so the passenger, if he keeps his eyes open, and fixes them on some point on the mountain, say at A, he will be able to see this point again at B, then after a while at C, then again at D, and finally at E, where he will be only a few rods from where he left A perhaps an hour before, only a little lower down, and this sort of thing is being enacted again and again on that United Verde Railway.

I was exceedingly fortunate in having for my traveling companion my good friend F. E. Jordan, as he had business in Prescott. He told me there is one place just out of Jerome where the railroad has 14 miles of track in order to accomplish a distance of only $5\frac{1}{2}$ miles—nearly three miles of crookedness to get ahead one straight mile. The railroad is about 2500 feet, or nearly half a mile, higher than the Verde River, which seems like a slender thread of silver all along the valley.

About 40 tons of copper are sent off by this crooked railway every day in the year. At the moderate price of 10 cts. per lb., the copper alone would be worth \$8000 a day; and there is a sort of understanding among the workmen that the *gold* in these ingots is worth about *twice* as much as the copper.

OUR HOMES.

The cares of this world, and the deceitfulness of riches, and the lusts of other things entering in, choke the word, and it becometh unfruitful.—MARK 4:19.

The principal thought I have in mind in the above words, spoken by our Savior, is that part about the deceitfulness of riches. Probably

nine-tenths of those whose eyes rest upon this printed page firmly believe that greater riches would make them happier; and I fear that a good many, at least, think that worldly prosperity would make them better Christians. In my recent travels in Arizona I met with people almost continually who are more or less interested in gold-mining. It is the absorbing topic of the day. Several times I questioned beekeepers, and I found to my surprise that almost every one of them had at different times had at least a taste of the gold-mining mania. Now, there are devoted Christians in Arizona; in fact, there are some of the most beautiful self-sacrificing Christian characters away out on the deserts that I ever met in my life. Some of them were interested in gold-mining. Yes, I know some good and faithful souls who have prayed that God would bless their efforts in locating a paying mine, or in so managing a mine already started that the expense would not exceed the value of the product. You may perhaps be aware that I was then, and am now, rather prejudiced against the gold-mining business. I was several times assured that it might be, and in fact should be, just as honorable as growing crops, selling goods, or any thing else. I replied that it had bad associations connected with it. Christian people usually object to card-playing because cards are the gambler's tools, and most people would prefer to have them out of sight if they thought the minister was likely to come. Well, in a like manner it seems to me that those who are affected with the craze for mining gold would hesitate a little to talk about it among Christian people. Now, please do not misunderstand me. Most of the men engaged in the mining business are a hard hearted and ungodly class. Let me illustrate:

One evening, when we were discussing the matter, I said something like this:

"Dear friends, when a man makes a lucky hit, and finds a good-sized nugget of gold, does he not usually thank God for this gift that has for ages been stored away for him, hidden in the earth, as it were?"

My friends looked at one another and smiled; and they finally admitted, each and all, that they never heard of a case of thanking God because one had made a lucky find.

"But when the proprietors of these mines 'strike it rich,' as they say, do they not, at least *sometimes*, give thanks to God that they are enabled to set a large party of men at work, paying them promptly every Saturday night, putting in nice and expensive machinery, etc.?"

Again my friends shook their heads, and smiled. Nobody had ever heard of any thing of the sort*. In the first place, all the successful mines, so far as I know or could learn about, are worked not only nights, but Sundays also. Several times this course was defended, and some of the friends assured me that, if I were right in the business, I would do as the rest do.

"Why, look here, Mr. Root. Where they have tried paying their men every Saturday night, and letting them have their Sundays without work, they all get on a big drunk. Sometimes there is a big fight along with it, and so the men entirely unfit themselves for business on Monday morning. The miners are

mostly of a class that can be kept from drinking and fighting only by keeping them busy. If they get drunk, and can not be on hand when the whistle blows, they lose their jobs; and this is the only thing that will keep them sober."

"But," said I, "have not the owners of the mines tried Sunday-schools and churches?"

"Not so far as we know. They have excellent reading-rooms. You yourself have seen some of them. They have fine schools and expensive teachers; but the proprietors of the mines do not seem to recognize the importance or need of churches."*

The miners are not, as a rule, paid every Saturday night, as we pay our helpers. I believe they are paid about once a month or at longer periods. One reason why they make their paydays as far apart as possible is because, when the men get their money, the bosses are absolutely *obliged* to give them a day or two to get over the effects of payday. Well, it is not only gamblers who keep track of these paydays, and are promptly on hand around the mines at such times, but I am told that lost women come from distant cities, even as far off as Los Angeles, that they may, while the poor miners are under the influence of drink, contest for their share of the spoils instead of letting the gamblers get all of it. Fights are common, and but few arrests are made. If a man is on hand when his time comes to go to work, that is about all that is required of him. At one place where I visited, a drunken man fell into an abandoned shaft. Some of the men were talking about it, and when I asked if any attempt had been made to recover his body, the reply came:

"To be sure, not. What do we want of his body? He was given to drink so badly that he was no good before, and we can not bury him any cheaper than where he is now. Why should we bother about him?"

If I am correct, the matter was dropped then and there. There was not a coroner within forty miles or more, and nobody thought it worth while to "bother" about it. Now to our text:

I told you I knew good devoted Christian men who were praying that God would bless their efforts to locate a profitable gold-mine. If God should hear that prayer, would it increase the faith of the one who prays? and would he be likely to make a good use of the money that comes? I am afraid, dear friends, that past experience shows that *money* does not make better Christians. I mentioned not long ago that our good pastor said he had never known a man brought to Christ or nearer Christ by prosperity, but many and many a one by adversity and affliction.

*One of the men said he had heard that the owner of one of the richest mines in Arizona was in the habit of spending a *million of dollars a year* at Monte Carlo, that celebrated gambling-ground where all the great gamblers of the world are wont to meet; and our proof-reader informs me that a writer at that place says the number of suicides there last year was 800, which is about a fair yearly average.

On page 130, Feb. 15, I spoke of the Rev. Mr. Healy, and his appointments for preaching in various places. One of these places is in Jerome. There is a Baptist-church there, as I have explained, but it is at present without a minister. Mr. Healy gets around once in two weeks, if I am correct, and preaches in the evening. I spoke of the fact that his people find it difficult to raise even a small portion of his salary. Well, if I mistake not he said the church at Jerome in the vicinity of that great mine, with its untold millions, finds more difficulty in raising the small sum of money they pay him than even the country places away out in the arid plains. Now, may be I have not got the facts in the case exactly right; but I think I am not far out of the way. And this little incident, it seems to me, points out to us all a tremendous moral. It is not because of lack of money that our missionaries are going without their pay, and our teachers in foreign lands are being called home by the scores. It certainly is not because of the *hard times* so much as it is because of the *hardness of people's hearts*. There is money enough to build railroads clear around

Toward twenty years ago I was quite well acquainted with a bee-keeper who seemed to be a very devoted man. He had some trouble with another man in regard to the sale of some bees. The matter was left to me. Both parties were professing Christians, and we soon had the matter pleasantly adjusted. It was years afterward that I met my bee-keeping friend. It was at a convention in a large city. I was surprised that he did not seem very cordial, and only incidentally referred to our former acquaintance and the service I once did him. I did not exactly understand it. A mutual friend explained. Mr. — had got out of the bee business, and gone into something else. He was prospered, and became quite well off. With the prosperity his Christianity slowly faded away, and he excused himself from attending an evening session of the convention by saying that he and a friend of his wanted to attend a place of questionable amusement. As he took his cigar out of his mouth and looked over toward me with a smile I brought a sad feeling to my heart. I said to myself, "Is it really possible that this is the man who wrote me those kind letters, and expressed in them such devotion to our Lord and Savior? and was it prosperity alone that has changed him from what he was then to what he is now?"

Dear friends, this is a sad thing to confess. Each and every one of us declares in our own heart that, if God would only try us, he would find that *we* are an exception. While I write I have in mind some plans of my own that have not turned out as I expected. I have been praying over them, and was *almost* rejoicing in the thought that God had answered my prayer. It turned out, however, otherwise, and I have been for several days feeling a good deal disappointed, and I asked myself the question, "Had God granted my prayer would it have brought me nearer to him?" I am afraid, to tell the truth, it would not. I know that prosperity—at least getting money easily—is not conducive to my best spiritual development. Some of you may think it a little strange that I, who have been greatly prospered, should write in this way. It is true, God has answered many of my prayers that might be construed in the line of worldly prosperity; but no prayer has been answered that did not require faithful and earnest hard work to bring about its fulfillment. I have tried to avoid anything that might look like show or display in the way of riches; and could you visit our own humble home I am sure none of you would say that Mrs. Root and myself have any thing about us that exhibits more display of wealth than you meet among quite ordinary people. I am *afraid* of what the world calls riches; and I pray that God may keep me from its "deceit," and, in the language of our text, from "the lusts of other things entering in" to "choke the word." Just a word more about the gold-mining business:

I confess I do not really know why it should be so much in the hands of sharpers. I do believe a man might be a consistent Christian, and manage a gold-mine. Let me give you a

the world, and enough to build hotels (that cost a million or more); and these things may be all right in their places; but there is certainly not any need in this world of ours that there should be starving bodies, and (sadder *still*) that millions of people should be starving for the bread of life. In speaking of Mr. Healy I am reminded of a postal card that came to me some time ago. — Here it is: □

—Bro. Root:—in your sermon on p. 130 you state that Bro. Healy is a "young Irishman, or at least he came from Ireland." This is a mistake; he was born in Illinois, of Irish parents; was converted under the M. E. Church South, in Mississippi.

Camp Verde, Arizona, Mar. 2.

L. B. BELL.

glimpse, however, of one little transaction in a quiet rural neighborhood in Arizona:

A stranger came into a little town and cautiously approached the bank. He told the cashier that he had some gold that he wanted to leave with him for safe keeping. The cashier handled the chunk with some curiosity, and asked him how he came by it. He said he got it out of a mine of his own, something like 80 miles off among the mountains. The man seemed to be very simple and uneducated. The cashier showed the gold to a neighboring business man, and they both asked the man more about his "find" away out in the wilderness. Before many months had elapsed, the cashier of the bank and this business man had bought an interest in this mine, raking and scraping and borrowing all the means they could get hold of. The owner of the mine, in order to have every thing fair and honest, permitted them to take entire charge of the works and run them for a week. The output of clean gold was, if I remember, several hundred dollars per day, and the ore seemed to be getting richer and richer as the miners went further. As soon as this simple, uneducated countryman, who could *neither read nor write*, got possession of the notes and securities, the yield of the mine suddenly dropped to thirty or forty dollars a day instead of three hundred or four hundred dollars as before. In spite of any thing they could do, the new owners could not make it yield any more. An experienced expert was finally called in. He made a careful analysis of the ore, and reported that the ore never did and probably never would furnish gold enough to pay the workmen. An expensive lawsuit followed, which revealed the fact that the owner of the mine had "salted" it during the week its purchasers had it on trial. Of course, he was standing around to instruct the new owners how to manage the different apartments; and while doing this he had smuggled several hundred dollars' worth of gold into the amalgamating works each day. He invested something in doing this; but his notes and securities amounted to many thousands. Of course, this was a state-prison offense; and although the evidence seemed complete, the man in some way eluded justice. I believe the purchasers recovered a part of what they lost. In undertaking to dispose of the expensive machinery they had invested in they were swindled and cheated *again* until it seemed as if the very spirit of the prince of darkness himself had got a lodging-place in the heart of every man who bought or sold, or had any thing to do with the matter of mining and working gold.

As I have said before, I do not really know why this should be; but this is true: There is danger lurking about any spot where gold is handled in considerable quantities. The papers are continually warning people—especially people who live in the country—against keeping money in their homes. Some time ago a man got an idea that our banks and government were going to the dogs. He got all his possessions into gold, and then started to carry his gold home, so as to have it *safe*. He was warned repeatedly that he would be robbed, and perhaps murdered, if he undertook to carry out his plan. After he had passed through several escapes, and had come near losing his life, he carried his treasured coins back to the bank, and concluded that he did not want any more of that sort of experience.

There is a fragment of an old hymn that just now comes into my mind. It may seem to you, my readers, a sudden break in my talk, and a very abrupt way of cutting away from my subject; but yet I am going to give you a verse

right here. It has given comfort and joy and peace to many a poor soul—poor, perhaps, in this world's goods, but rich in treasures that neither perish nor pass away. Here it is:

Know, then, soul, thy full salvation;

Rise over sin and grief and care;

Joy to find in every station

Something still to do or bear.

One thing that has endeared this verse of this old hymn to my heart is that about rejoicing because that, no matter where we are nor what our station, whether rich or poor, we may every day find something to "bear." And if we bear it for Christ's sake we are rich indeed.



CLEARING OFF THE BEDS WHEN A CROP IS NEARLY MATURE.

There are a thousand things that need wisdom and experience in high-pressure gardening; and with a dozen boys to do the work, a smart man can be kept just as busy as he can be, directing the boys to work to the best advantage. No matter how good his boys are (we think we have some in Medina as good as there are anywhere), they want their work laid out and carefully planned. A good many times the boss wants somebody with rare wisdom to plan and direct *him* in turn. Just one illustration:

Our plant-beds are now all made up of very rich ground. The manure has cost so much money, to say nothing of bone dust, ashes, etc., that we can not afford to have a bed stand idle for even one day. Just as soon as one crop comes off, another must follow in its wake. We frequently gather onions, lettuce, etc., taking off, say, the space of three or four sashes each morning. Well, this ground should be raked and spaded over, and planted again right off within an hour after the crop is gathered. When some more stuff is gathered, commence where you left off, and break up ground again, and put in the crop. As a rule, our plants are raised in the seed-bed, as thickly as they can stand, until they get the third or fourth leaf. Then they are transplanted, as I have said, to where a crop has just been gathered. In transplanting, we use the transplanting-boards I have so often mentioned. We now have in use five. The closest spacing-board is for celery-plants, 2 inches apart. The next is for cabbage-plants, beets, onions, etc. 3 inches apart. Then we have one for stuff that is a little larger, or wants more room, $4\frac{1}{2}$ inches apart. This is used for twice transplanting, or tomatoes and bushy plants for first transplanting. Then comes the board with the points 7 inches from center to center. This is just right for lettuce, spinach, tomatoes twice transplanted, and a variety of other stuff. The fifth and last one has the points a foot apart. Of course, they are all arranged hexagonally, so as to utilize space that is valuable. This last board, that spaces them a foot apart, is for strawberries where the runners are kept off; for early cabbage-plants to mature under glass, for potatoes grown under glass, etc.

Let us now get back to gathering the matured crop, or nearly mature. Before cleaning off the bed entirely (say of lettuce, spinach, etc.), we first cut out the largest plants where they seem to be crowding. With spinach we go over

the bed in this way and keep out any that seem inclined to shoot up to seed. This process can be carried on until it is evident that all the plants in the bed have plenty of room, and are about as good as they will ever get. Then we begin at one end, say where plants are the largest and strongest, and will probably not get any better by being left longer, and clean the bed off entire.

It is a great mistake to cut a crop when it is half grown. Sometimes, however, it pays to do this. In February a customer was very anxious for some spinach. I told him if he was willing to pay 20 cts. per lb. for it I would cut some that was only half grown. This they agreed to do. Now, when the plants are about as large as they will be we get 10 cts. per lb. for it. It is packed for retailing, one pound in a clean new half-peck basket, and the demand is beyond the supply. Why, friends, if this beautiful plant can be really grown under shutters instead of sashes it would be about the nicest business in the world to grow it at 5 cts. per lb.

For spinach the ground must be exceedingly rich—just such ground as we talked about in our last issue, for the new celery culture. The beds where it grows should be largely well-rotted manure. If a part of it is cow manure, all the better; then put on some bone dust and ashes besides, and make the leaves take on that strong rank dark-green appearance. If grown in this way, spinach, like lettuce, will sell almost every day in the year; but on ordinary soil, where the leaves look yellow and sickly, your customers will tell you that they "don't want any."

Speaking of shutters reminds me that I have never yet had a shutter that suited me, and I have spent a good deal of time and experimenting along that line. One of the heaviest expenses in our market gardening is broken glass. If the children do not break the glass in throwing stones, somebody's dog will take a notion to walk over the beds. Well, shutters made of boards will do just as well as glass when the plants are only to be covered nights, or, say, during the most severe freezing weather. These shutters are not broken like glass—that is, if well made; and they ought to be so light that one man can easily handle them. Friend Cummings, of the Lake Shore Canning Factory, has grown nice tomatoes with only boards for protection. The boards are only one foot wide. Sometimes when the frost is severe he uses a cloth cover with boards on top of it. One man can pick up boards a foot wide, and pile them up quite rapidly; whereas, to handle sashes it usually takes two men. Well, now, the idea of shutter should be exactly the size of our sashes. It should be as tight as a sash, and it should stand storms of snow and rain, and the intense heat of the sun, without shrinking and swelling so as to roll up the lumber or make the cracks large enough to let frost through, and at the same time we want it light. The board covering need not be more than $\frac{3}{8}$ of an inch thick, if the frame around the outside is made of something heavier to protect the edges. If any of our gardening friends have succeeded in producing a light shutter to take the place of glass I should be very glad to see one. I think there is a field here for inventive genius. The ordinary way is, I believe, to use thin matched lumber in narrow strips, for the narrow strips will not shrink and swell as badly as the wider pieces; but $\frac{3}{8}$ stuff, or even $\frac{1}{2}$, is very apt to get shattered and broken unless it is well protected by battens. The nails should be driven through and *clinched*. Then the extreme end of the shutter should have some protection as well as the edges along

the sides. The picture of shutters given in Dreer's book seems to be simply narrow matched lumber $\frac{3}{8}$ or $\frac{1}{2}$ thick. That will do very well, but this makes them heavier to handle than they really need to be. After snowstorms are all over, cotton cloth will do very well in place of shutters. But cotton cloth is liable to be weighted down by heavy snows, even in April, in our locality. Shutters are not only needed to keep out frost, but to protect the plants from the heat of the sun when they are just put out; to shade lettuce so as to have it bleached as I have explained; to protect tender tomato-plants from being whipped by cold winds, and for ever so many other purposes. Even if we have the cotton sheeting to be rolled up on poles, we want shutters to cover little patches of something or other to follow up where we are transplanting. Now, if any of you have studied on this matter of cheap shutters, I wish you would send me a description of what you have, or a little model, by mail.

HOW TO GROW SQUASHES AND NOT HAVE THEM ALL DESTROYED BY BLACK BUGS AND BORERS IN THE ROOTS.

I have tried every thing that I have heard of except late planting. They understand raising them in Ohio, for there are lots of Hubbards shipped in here from Toledo. I have had a total failure for two years. One year I had two acres, and lost every plant after going over them five times, picking bugs and dusting the vines. C. H. BILLINGHURST.
Albion, Mich.

We have had more or less experience every year for many years past in growing squashes, and we have "licked" the bugs every time—that is, where we grew them on our rich creek-bottom land. On our upland soil we have several times made almost entire failure. First, you want rich bottom land suitable for squashes. Then it wants to be manured tremendously with old well rotted manure. You want to read "Gregory on Squashes" to get an idea of the amount of manure really needed for a crop.

In regard to bugs, when the squashes are small the only dead-sure thing we have ever found is to cover them with wire-cloth bug-protectors. These are pressed down over the hills, and the dirt packed around so no bug, black or striped, can get under the edges. It takes a good many bug protectors for an acre, it is true; and we have of late years succeeded very well by covering the young plants pretty well with tobacco dust. This is worth almost all it costs, for a fertilizer; but if you have frequent rains heavy enough to wash the tobacco dust off, it will take several applications. After the plants get so large as to crowd against the wire cloth they will usually take care of themselves, but not always. If they do not, you have got to fight; hand-pick the bugs; examine the under side of the leaves for eggs; and if you follow the business right up you will generally come out ahead. The bugs evidently know when a man really means business. The squash grower ought to have a good-sized family of children; and if they all have a common interest with the father in the work the bugs will generally give it up.

The worst trouble when the vines get to running is the borer in the pith of the vine; and there is only one remedy I know of, and that is to cover the vines with earth every yard or so as soon as they begin to run. In good soil, and with plenty of rain, the vines will take root at the joints very quickly; and if the borer commences near where the plants started originally, the damage it does will be only temporary. Plant-lice on the roots are something I have

never had any experience with; but I have been told that, if you make a little hole in the soil with a stick, and pour in a little bisulphide of carbon, you will get rid of the plant-lice. Of course, you must be careful not to kill the plants. Hubbard squashes are raised successfully all over Northern Ohio; and we had some very fine ones brought us as late as the first of April this year.

Let me again emphasize having the ground exceedingly rich. I know a man who cleaned out his poultry-house, and put the contents on his garden so much in one place that he could not grow any thing that season—not even squashes. The next year he plowed it up very deep, and had an enormous crop of Hubbard squashes. The ground was so exceedingly rich that the bugs could not stand it. In fact, I have heard of putting so much strong manure around squash-vines that the bugs could be seen going away holding their noses. Strong, rank, offensive manure will very often give the vines such a start that the bugs can not well harm them, and at the same time will repel them by the rank odor. Where the ground is too poor to give a vigorous growth, the bugs seem to make the most havoc.

THE FIRST REPORT OF COWS THAT WILL NOT EAT SWEET CLOVER.

My cow has the range of 40 acres part of the time—one acre in sweet clover, now in luxuriant growth, a foot high, in its second year, and I have not yet seen her touch it, though she eats the alfalfa next to it with relish.

SUGAR-BEETS.

You say the sugar-beet belt is through Wisconsin and Northern Ohio, south of Lake Erie. Perhaps you are not aware of the thousands of acres here in the Pecos Valley, where our constant sunshine enables us to raise sugar-beets, which, with our crude experience of a first season just closed, enabled us to raise beets not only of 14%, but by the scores of acres 16 to 20% sugar. One acre had ran from 19 to 21%; and this can be done on 10,000 acres yet in unbroken natural state, with our irrigation facilities. I raised beets last season, one of which—not an exceptionally large one by any means—weighed 15 lbs. 6 ozs. with top, and 9 lbs. 11 ozs. as trimmed for the factory.

A HOUSE-APIARY THAT PROVES SATISFACTORY.

On page 242 in Dr. C. C. Miller's remarks on house-aparies, he says some like them, some do not. I have one for 139 colonies; have just had photo taken of my ranch. You will have no difficulty in picking out the house-apary. I can do more work at my bees in the house in three hours than I can at the bees outdoors in a whole day; no need for veil, and very little for smoker. Every thing is at hand to work with inside. Bees are not so irritable—no robbing to amount to any thing; all in shade; swarming not enough to consider; have not had a swarm yet, and have used it over one year. Mine is, I think, unique—so far as I know the only "adobe" bee-house in existence. If there is, or has been one before, I should like to know. My hives are set back 3 inches from wall; bees at liberty to come into the house if they wish, but they don't.

□ Eddy, N. M., Apr. 12.

JOHN SINGLETON. □

Friend S., if your cows should run out of feed, and be obliged to eat that sweet clover, my opinion is that, after they have learned how, they would take it in preference to any thing else. Your locality, however, may make a difference. It is not at all strange that they should take the alfalfa first, especially if they are used to it; for I tell you alfalfa comes pretty near being the best "feed" that the world supplies.

We rejoice with you in regard to your success with the sugar beet.

In regard to the house apiary, that may be a little out of this department, but I guess most of the bee-friends will see it. I am very glad to